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**“FEEDING AND MANAGEMENT PRACTICES ADOPTED BY
CATTLE OWNERS IN SUGARCANE POCKETS OF LATUR
DISTRICT”**

By

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T7826

B. Sc. (Agri.)

**MASTER OF SCIENCE
(Agriculture)**



IN

**ANIMAL HUSBANDRY AND DAIRY SCIENCE
(ANIMAL HUSBANDRY)**

**DEPARTMENT OF ANIMAL HUSBANDRY AND DAIRY SCIENCE
COLLEGE OF AGRICULTURE, LATUR
VASANTRAO NAIK MARATHWADA KRISHI VIDYAPEETH,
PARBHANI -431 402 (M.S.) INDIA.**

2016

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DISSERTATION

Submitted To The

***Vasantrao Naik Marathwada Krishi Vidyapeeth,
Parbhani in Partial Fulfilment of The Requirements
For The Degree of***

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IN

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SCIENCE**

COLLEGE OF AGRICULTURE, LATUR

**VASANTRAO NAIK MARATHWADA KRISHI
VIDYAPEETH, PARBHANI-431 402 (M.S.) INDIA.**

2016

*Affectionately
Dedicated to
My Beloved
Parents
And
Research Guide*

CANDIDATE' S DECLARATION

*I hereby declare that the dissertation
Or part thereof has not been
previously submitted by
me for a degree of
any University or
Institute.*

Place: Latur

Date: 30/05/2016


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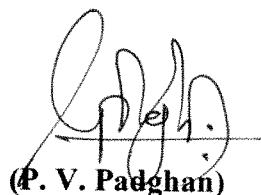
CERTIFICATE - I

This is to certify that the dissertation entitled **“FEEDING AND MANAGEMENT PRACTICES ADOPTED BY CATTLE OWNERS IN SUGARCANE POCKETS OF LATUR DISTRICT”** submitted by **Mr. TAMBOLI SAINATH SAMBHAJI** to the Vasantrao Naik Marathawada Krishi Vidyapeeth, Parbhani in partial fulfilment of the requirement for the degree of **MASTER OF SCIENCE (Agriculture)** in the subject of **ANIMAL HUSBANDRY AND DAIRY SCIENCE (Animal Husbandry)** is record of original and bonafide research work carried out by him under my guidance and supervision. It is of sufficiently high standard to warrant its presentation for the award of the said degree.

I also certify that the dissertation or part thereof has not been previously submitted by him for a degree of any university.

Place: Latur

Date: 30/5/2016



(P. V. Padghan)
Research Guide and Chairman
of Advisory Committee

CERTIFICATE - II

This is to certify that the dissertation entitled **“FEEDING AND MANAGEMENT PRACTICES ADOPTED BY CATTLE OWNERS IN SUGARCANE POCKETS OF LATUR DISTRICT”** submitted by **Mr. TAMBOLI SAINATH SAMBHAJI** to the Vasantao Naik Marathawada Krishi Vidyapeeth, Parbhani in partial fulfilment of the requirement for the degree of **MASTER OF SCIENCE (Agriculture)** in the subject of **ANIMAL HUSBANDRY AND DAIRY SCIENCE (Animal Husbandry)** has been approved by the student's advisory committee after viva-voce examination in collaboration with the external examiner.


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Place : Latur


(TAMBOLI S. S.)

Date : 30/05/2016

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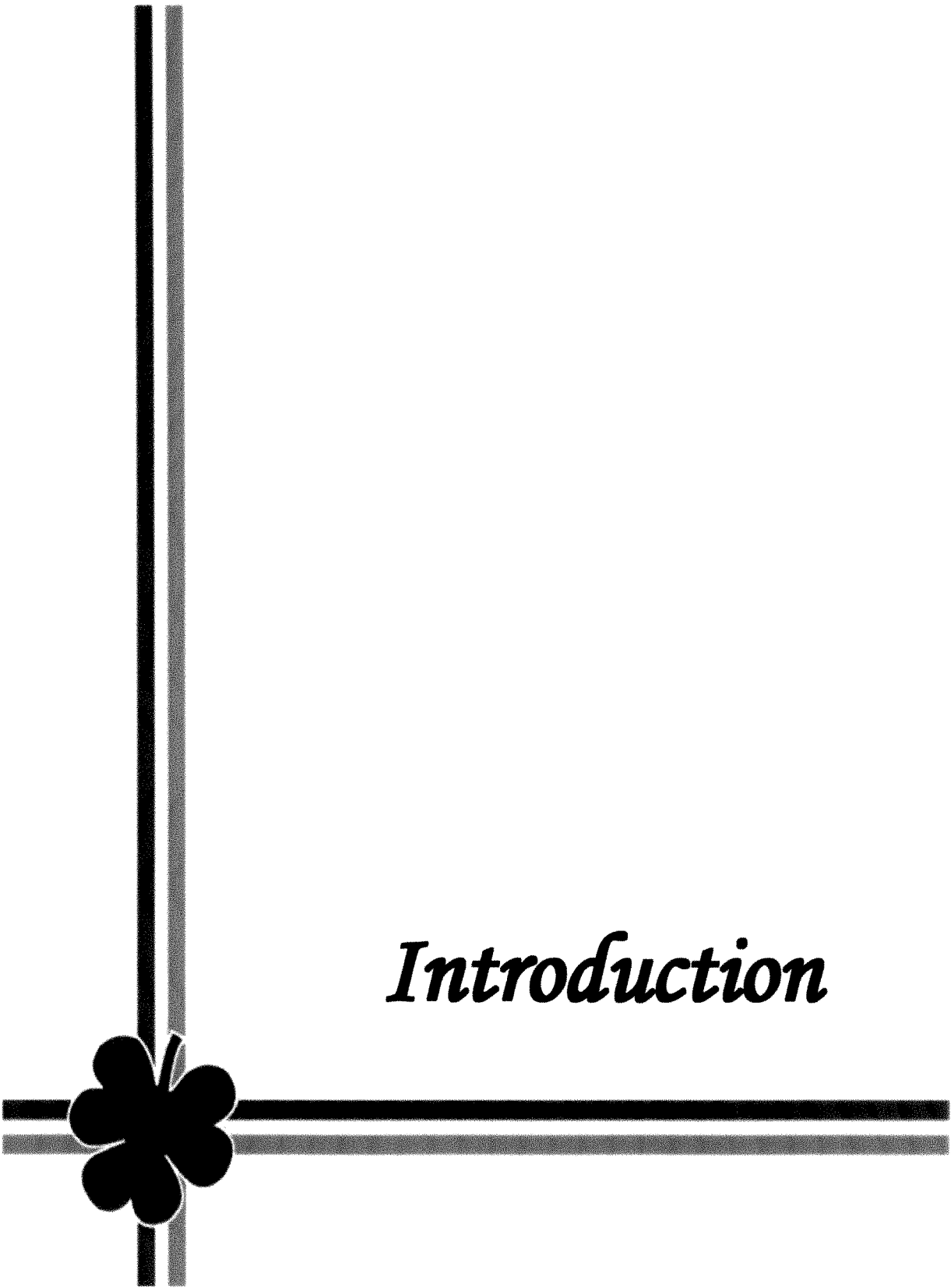
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ABBREVIATIONS

%	=	Per cent
@	=	At the rate
>	=	Greater than
⁰ C	=	Degree Celsius
A.I.	=	Artificial Insemination
e.g.	=	Exempli Gratia
<i>et al.</i>	=	And other
Fig.	=	Figure(s)
ha	=	Hectare(s)
hrs	=	Hours
i.e.	=	That is
No.	=	Number(s)
kg	=	Kilogram(s)
SCT	=	Sugarcane Tops
viz.,	=	Videlicet (namely)
SIG	=	Significant
NS	=	Non significant
SD	=	Standard deviation
r	=	Correlation coefficient
x	=	Independent variable
y	=	Dependent variable
$\overline{X}$	=	Mean
TS	=	Total Score
MS	=	Mean Score
MPS	=	Mean Percent Score
RO	=	Rank Order
RA	=	Regular Adopted
OA	=	Occasionally Adopted
NA	=	Not Adopted



Introduction

CHAPTER - I

INTRODUCTION

India is at first rank in livestock population which possess near about 17 per cent of world livestock population. The total bovine population of India is 299.9 million. Out of which cattle population of country is 190.90 million, which is 16 per cent of world cattle population. In that, total female population of cattle in India is 122.9 million, exotic milch cattle population is 19.42 million and indigenous milch cattle population is 48.12 million (Livestock census, 2012). India's milk production also at first position accounting for 18.5 per cent of world production, achieving an annual output of 146.3 million tones during 2014-15 as compared to 137.69 million tonnes during 2013-14 recording a growth of 6.26 per cent.

The animal husbandry is based on four pillars, viz., innovating breeding, appropriate feeding, excellent management and well supervised health care practices. Animal nutrition experts have indicated that the milk production could be increased by 50 per cent through balanced feeding and scientific management. The exploitation of genetic potential of animal are mostly related to its management particularly feeding and health care. Current economics indicate that it is economically feasible to feed diets containing large quantities of chopped sugarcane to growing cattle in developing countries in the tropics. Sugarcane offers several unique advantages over other field crops as forage for cattle in the tropical and subtropical areas. It is adapted to environmental conditions and a technology for its production exists in tropical and subtropical regions. Sugarcane maintains a consistent quality for long periods as a standing crop in the field.

Sugarcane is an important commercial crop of the country occupying around 3.8 million hectares of land with an annual cane production of around 270 million tonnes. That is, it occupies about 2.8 per cent of the cultivated land area and contributes about 7.5 per cent to the agricultural production in the country. About 35 million farmers grow and depend on sugarcane for their livelihood. And an equal number of agricultural labours earn their living by working in sugarcane farms. India was the 2nd largest producer of sugar in the world after Brazil and share in the world production of sugar was 17 per cent in 2014-15 (Commodity Profile of Sugar, 2015). Sugarcane green tops are used as cattle feed. During the last five years, estimated yearly cane top production output has been 4.7 million metric tons, with an average

production of 11.5 tons per hectare. Around sugar-producing areas, small farmers collect cane tops during milling seasons as feed for their cattle, carabaos, horses, goats and sheep. Among medium and large livestock raisers, the cane tops are chopped and fed to animals or ensiled for use during off-milling seasons. This is a very popular and easily available feed among small livestock raisers who have their farms around the vicinity of sugarcane plantations. During milling seasons, sugarcane planters allow small farmers to collect cane tops from the fields to feed their livestock.

Indian farmers are doing farming as a diversified in which they cultivate different crops as per their available resources and personal need as well as market demand. Very few farmers doing specialized or sole farming. It is not possible to do specialized farming in Indian condition due to the less land availability, market demand and climatic condition. In such situation, there is need to find out such type of farming, which is helpful to their farming occupation as well as supporting business like dairy, poultry, goat rearing, etc. Secondly, the availability of agricultural land in India is reducing day by day due to urbanization, increasing population and industrialization, which affecting on grazing land and cropping land. In such situation there is need to find alternate way for maintenance of animal with least cost combination of existing cropping pattern and economic interest of animal rearing, which might be helpful to agriculture and dairying and ultimately to farmers of India. By keeping this view in mind this study was designe as, entitled "Feeding and management practices adopted by cattle owners in sugarcane pockets of Latur district" with following objectives.

- 1) To study the feeding practices adopted by cattle owners in sugarcane belt of Latur district
- 2) To study the management practices of cattle
- 3) To find out the gap between existing and recommended management practices
- 4) To study the ways and means in feeding and management practices

*Review of
Literature*

CHAPTER - II

REVIEW OF LITERATURE

The review is required to discuss and compare the research findings, which is presented in four parts i.e. feeding and management practices, constraints of animal rearing, feeding of sugar cane tops and adoption of various management practices of cattle as follows.

2.1. Feeding and management practices of cattle

Shirsat *et al.* (1991) conducted survey in five villages of Parbhani district of Maharashtra and revealed that majority 95 per cent of the respondents were feeding cotton seed cake to milking animals and 90.83 per cent respondents were feeding concentrate at the time of milking, whereas 68.33 per cent respondents supplied green fodder in proportion of milk production, 68.33 per cent farmers followed the practices of harvesting fodder crops at flowering stage for hay making.

Balakrishnan (1997) conducted the study in Karnataka and found the maximum technological gap in feeding practices 69.88 per cent followed by health care 43.90 per cent management 41.54 per cent, calf rearing 34.41 per cent and breeding 19.42 per cent practices.

Patange *et al.* (2002) assessed the nutrient availability of milch Marathwadi buffaloes reared by different categories of farmers in the Marathwada region of Maharashtra state. Overall ration of milch buffalo consisted of 5.41, 5.09 and 2.16 kg of green fodder, dry fodder and concentrate, respectively. Maximum (6.60 kg/day) green fodder was supplied during winter season (October-January) whereas maximum dry fodder (6.00 kg/day) and concentrate (2.25 kg/day) were supplied during summer season (February - May). The average DM, DCP and TDN supplied throughout the year to the buffaloes were 7.610 ± 0.13 or 0.460 ± 0.003 and 4.650 ± 0.002 kg/ha/day, respectively.

Gujar *et al.* (2004) observed that, only 33.13 per cent farmers tied high producing buffaloes during day and night i.e. stall fed condition and 66.87 per cent practiced grazing and stall feeding together. Animals were maintained mainly on stover of bajara and jawar and concentrate mixture was offered to buffaloes during milking time only. All respondents adopted natural service. This was large gap between existing and recommended practices.

Kumar *et al.* (2005) stated that the majority of farmers cultivate fodder for their animals and used stall feeding in 85 per cent cases. Almost all farmers were feeding concentrates to lactating buffaloes. Only 6.25 per cent of respondents were using loose housing for the animals. Majority i.e. 60 per cent had mud floor in the animal shed. In most of the cases hygienic conditions were not followed.

Bainwad *et al.* (2007) observed that the maximum farmers offered green fodder (8.6 kg) to milch buffaloes followed by dry fodder (5.22 kg) and concentrate (3.19 kg). Before milking the practice of cleaning of udder, milk utensils and shed floor was adopted by cent per cent farmers. They were also well aware about adoption of vaccination 95 per cent.

Khode *et al.* (2009) carried survey studies on Vidarbha Development Programme Package (VDPP) launched by Maharashtra government in 2004 and noticed that 82.56 per cent beneficiaries purchased one dairy cattle under Vidarbha development programme package (VDPP) and above half of beneficiaries (51.16 per cent) had daily milk production between 5.1 to 10 liter from purchased dairy cattle under VDPP. Majority of beneficiaries 73.26 per cent had medium knowledge level. 53.49 per cent of beneficiaries had high experience in dairy farming, while 91.86 per cent had never attended any training on dairy farming. The majority of beneficiaries (65.12 per cent) had secured medium adoption of improved dairy cattle management practices. While, 18.60 per cent and 16.28 per cent of beneficiaries had low and high adoption of improved dairy cattle management practices, respectively.

Mande and Thombre (2009) studied adoption of cattle rearing practices by dairy cattle owners in Latur district and reported that maximum score was obtained for adoption of cattle breeds of the region (90) followed by rearing of improved cattle breeds (65), adoption of types of cattle breeding (64), appropriate age of cow for breeding (53) and selection of bull for breeding (45) as adoption of breeding practices by the dairy cattle owners. It was also observed that the category wise adoption index was presented in which feeding practices for cow possessed more adoption index (57.36) followed by feeding practices for newly born calf (54.83), breeding practices (52.83) and health care practices (40.20). The overall adoption index was 52.17.

Meena *et al.* (2009) observed that farmers offered somehow equal amount and type of feeding to their adult (wet and dry) animals, without knowing the nutrient requirement of animals on different stages. The results indicated that large

farmers hold (60.57 per cent) knowledge where as remaining four categories of farmers were more or less having equal extent of knowledge in relation to feeding practices of dairy animals.

Sinha *et al.* (2009) observed in rural areas of Bareilly tahsil of Uttar Pradesh that the 73.3 per cent farmers were using sugarcane leaves and 13.3 per cent using straw as feeding material in winter, but in semi urban areas, 44 per cent of the farmers were using straw and 41.1 per cent using sugarcane leaves whereas, in urban areas 28.9 per cent were using straw and 22.2 per cent using sugarcane leaves. In rural areas, 85.6 per cent of animal houses were clean in comparison to 74.4 per cent semi-urban and 64.4 per cent urban houses. Disinfectants were used by 7.8 per cent, 11.1 per cent and 8.9 per cent of rural, semi-urban and urban farmers, respectively, in their shed.

Wani *et al.* (2009) undertaken study to examine livestock husbandry practices adopted in various agro-climatic zones of Jammu and Kashmir. Maximum concentration in bovine population was used for local cows in intermediate zone. Artificial insemination was most popular in temperate zone and jersey was preferred exotic breed because of better fat percentage and lower feed requirement. Animals were mostly stall feed in subtropical and temperate zone. The results suggested the need of location specific prospective plan in animal husbandry practices like feeding, breeding and management for overall development.

Rathore *et al.* (2010a) conducted survey in Chura district of Rajasthan to acquire first hand information on existing breeding, feeding and housing management practices for dairy cattle. It was observed that 86.00 per cent of the respondents resorted to natural service, 61.75 per cent inseminate their cows at an early heat stage, regarding feeding practices majority of farmers followed group feeding 68.75 per cent and grazed in fallow/harvested field 62.25 per cent. Home prepared concentrate mixture 60.50 per cent with soaking 78.50 per cent was prevalent in that area. All the cattle keepers had kutcha floor in shed and 58.50 per cent were kept their cattle near dwelling house.

Rathore *et al.* (2010b) studied existing breeding, feeding and health care practices followed by the crossbred cattle keepers in Jhunjhunu district of Rajasthan and reported that majority (78 per cent) of the crossbred cattle keepers resorted A.I. services and only 22 per cent followed natural services. Regarding quality of breeding bull, crossbred bull 45 per cent were more preferred by the

farmers followed by exotic 35.67 per cent, indigenous 13 per cent and nondescript 6.33 per cent. About half (46.67 per cent) of the farmers inseminated their cows in mid heat stage followed by later heat stage (32.3 per cent) and early heat stage (21 per cent).

Sabapara *et al.* (2010) studied existing housing and feeding management practices by using predesigned and pretested questionnaire from 200 dairy animal owners. They observed the close type of animal house was provided by 98 per cent of the farmers, kaccha type of floor was observed in 87 per cent of the houses, earthen plates with thatch roof were present in 94 per cent of the animal shed and wooden poles were use to support roof 85.5 per cent of the houses. All the farmers provided green natural border grasses of cultivated plots and grasses from fellow land. In addition to these 75 per cent of the farmers grew fodder crops. None of the farmers had practice of silage making and concentrate was fed to the animals. Minerals supplement were provided by only 30.5 per cent of the farmers to their milch animal.

Shivakumar *et al.* (2010) reported that over 98 per cent of the animals were taken for grazing. Hence, feeding straw and grazing was formed basal diet for most animals i.e. for 17 per cent of the farmers as a sole diet out of them 91 per cent of the farmers offered some green fodder along with this basal diet and only 31 per cent of the farmers were found feeding concentrates to their animals. Finding emanating from the study out of 30 farmers 17 per cent were rearing animals for draft purpose and among 176 farmers 98 per cent were rearing for milk production. Animal husbandry is playing multidimensional role in the socio-economic spheres of our farmers.

Avinashilingan *et al.* (2011) reported in their study carried out in Nilgiri district of Tamil Nadu that the majority of tribal households followed the feeding livestock and watering to the animals (50.88% regular and 33.33% sometime), cutting of grass (56.86% regular and 17.65% sometime), chopping of straw (58.82% regular and 11.71% sometime) and grazing of animals (52.94% regular and 21.97% sometime).

Kannan *et al.* (2011) undertaken study at Chittoore district of Andhra Pradesh and concluded that ration balancing was a potential to improve milk

production, microbial protein synthesis and reduce methane emission from lactating crossbred cows.

Sarap *et al.* (2012) studied animal husbandry practices followed by cattle owners in Karanja tehsil of Washim district and reported that, majority of farmers (82.35 per cent) mated their local cattle 83.33 per cent within 6-8 hrs. While, a few farmers 17.64 per cent served their cattle after 8-16 hrs from the induction of heat. Crossbred cattle farmers 87.05 per cent served their cattle within 6-8 hrs, while only 12.94 per cent farmers served cattle after 8-16 hrs of the induction of heat. It was further observed that, majority of farmers 85.88 per cent used crossbred cattle bull for local cattle.

Calamari *et al.* (2013) evaluated the effects of three different feeding management (FM) schedule on physiological markers of heat stress (HS), metabolic conditions, milk yield and quality during the hot season in dairy cows. During the hotter days, cows receiving morning treatment showed higher values of rectal temperature (38.97 °C - 38.68 °C and 38.62 °C) in morning and half in the evening and once daily in the evening(E) and breathing rate (71.44 - 66.52 and 65.26 breaths min⁻¹, in M and E), plasma glucose was lower in M (3.69 - 3.83 and 3.83 mmolL⁻¹ in M and E) and a.m. plasma urea was lower in (E) evening. Only milk protein content and yield were higher in morning. Results on cow physiology indicated that M seems a less suitable FM to match cow welfare during the summer season.

Kulkarni *et al.* (2013) noted that majority of the Kathani bullock and cow of Vidharbha region of Maharashtra state were washed regularly 93.89 per cent only few animals 6.23 per cent not washed due to owners ignorance. It was noticed that the means of chest girth, body length and height at wither for five matured breeding bulls were 145.40, 117.40 and 120.00 cm, respectively. On an average cows had 140 cm chest girth, 113 cm body length, 105 cm height at wither, 12 cm horn length, 17 cm ear length and 68 cm long tail up to the switch. The corresponding figures in bullocks were 153, 119, 108, 15, 18 and 71 cm, respectively. The estimates of chest girth, body length and height at wither reported by Anonymous, 2008 in Gaolao cattle were higher than the present reports.

Kumar *et al.* (2013) clearly indicated that there was highly significant difference ($P < 0.01$) in the knowledge level of the respondents before and after training. The Garrets Ranking technique revealed that the top score of 73.11 had been given to the cross bred animal which showed a marked increase in milk yield during

the experimentation period of 15 days as adoption of new feeding technology and ranked the first position.

Meena *et al.* (2013) results of the study indicated that 100 per cent, 68.75 per cent and 50 per cent farmers were feeding dry fodder, green fodder and concentrates, respectively to milch animals. The average daily quantity of green fodder, dry fodder and concentrates fed per milch buffalo were 2.25 kg, 7.75 kg and 0.55 kg while corresponding figures for milch cows were 1.90 kg, 6.25 kg and 0.45 kg. Green fodder and concentrates were not fed to dry animals by the tribal farmers. On an average, 32 per cent of total milk production was sold only to local consumers. All farmers taken away or leaving their animals for grazing for period of 5-8 hours in a day. On an average, 73.75 per cent, 50 per cent and 52.50 per cent farmers were feeding dry fodder, green fodder and concentrates, respectively.

Varaprasad *et al.* (2013) observed that 25.79 per cent farmers were feeding green fodder *ad libitum*, 56.32 per cent farmers were feeding restricted green fodder and remaining 17.89 per cent were not feeding green fodder at all. This may be due to lack of sufficient irrigation facilities to the farmers in Chittoor. Lack of green fodder was mostly substituted by grazing.

Buragohain and Kalita (2014) observed that no extra mineral supplementation was given to the lactating dairy animals except the common salt, the concentrate mixture (CM) and local mixed grasses and tree fodders (MGTF) were the sole sources of dietary macro and microminerals. Low serum calcium and phosphorous level might be for low dietary intakes and drainage through milk. Except Iron (9.43 ± 0.22 ppm), serum concentration of Cu, Mn and Zn were lower than normal levels. This might be for rich iron level, but poor content of other minerals both in the CM and MGTF fed to the dairy animals.

Jadav *et al.* (2014) reported that most of the respondents (60 per cent) fed both leguminous and non-leguminous green fodder. Majority of the respondents (86 per cent) fed only paddy straw followed by paddy along with jowar straw 8 per cent and paddy along with jowar and wheat straw 6 per cent. Rice was the major cereal crop cultivated in the study area. This might be the reason why majority of the respondents fed only paddy straw.

Kejeri *et al.* (2014) reported that the overall, 77 and 48 per cent of the cattle sheds had poor hygienic state and unacceptably high stocking density, respectively. About 87 per cent of the dairy farmers cleaned the udder/teats with cold

tap water prior to milking but did not have towels for drying the teats. Feeding systems and breeds of the cows had no significant effect on chemical composition of milk. Season of the year had significant effect on butter fat, total solids and solids non-fat contents but not crude protein content.

Kumar *et al.* (2014) studied breeding, health care and milking management practices adopted by the dairy owners in Shahdol district of MP, India and reported that more than 90 per cent of the farmers from all the area were practicing natural service for breeding. The main symptoms for identification of animal in heat was bellowing for 41 per cent, 45 per cent, 45 per cent, 52 per cent and 56 per cent farmers in Gogpur, Burhar, Jaisanghnagar and Sohagpur areas respectively. Farmers were checking their animals for heat detection in the morning and more than 60 per cent farmers provide more than two services for setup of pregnancy, about 12 per cent farmers got animals pregnant by one service.

Letha *et al.* (2014) conducted study in peri-urban and rural localities of rural Bangalore district of Karnataka. Data were collected personally from 180 dairy owning households from peri urban and rural areas. Information on family education status, herd size, input availability, market facilities, level of knowledge about improved dairy husbandry practices, economic motivation, scientific orientation, achievement motivation and self confidence, found positive and significant relationship with management efficiency of overall sample of respondents, irrespective of the localities. The regression model showed 81.70 per cent variability in management efficiency among rural respondents followed by 76.20 per cent variability in peri-urban areas.

Manohar *et al.* (2014) studied feeding management practices of buffaloes in relationship with selected traits of respondents in Jaipur district of Rajasthan and reported that 87.50 per cent of farmers grazed their animals and all the farmers were using stall feeding for their buffaloes. Majority (71.87 per cent) of the farmers fed their animals in groups, while 28.12 per cent of the buffalo keepers fed their animals individually.

Marghazani *et al.* (2014) reported that estimated dry matter/crude protein availability from *kharif* and *rabi* fodders in Balochistan were 117000/9360 and 100540/18097 tons, respectively. Among industrial by products, wheat bran, rice husk and rice polishing were obtained locally. The prevailing livestock feeding practices in the province revolves around grazing fodder and mixed feeding systems

which need more improvement for balanced feeding coupled with development of feed resources for better meat and milk production and economic returns.

Patel *et al.* (2014) revealed that maximum farmers (41.30%) of this area were less educated belongs to middle age (53.80% 30-50 years) category having medium size family (5-8 members). The farmers (86.30%) were observed to inseminate their animals within 12-18 hrs of heat. Method of breeding adopted in area was mostly (46.30%) by combination i.e. Natural and artificial insemination (A.I.). Mostly the pregnancy diagnosis (P.D.) was practiced by 18.80 per cent of the farmers. Dry period was more than three months in both indigenous cows (92.40%) and buffaloes (91.20%). Castration was performed in 72.70 per cent of male animals of age more than 2 years. Vaccination was adopted by 53.80 per cent of farmers. Regular de-worming was also practiced by 3.80 and 7.50 per cent farmers for milch cow and calf respectively. Clean milk production was well adopted by farmers of the area. Knuckling (95.0%) was common method of hand milking followed by full hand (3.80%) and stripping (1.30%).

Stank *et al.* (2014) surveyed and revealed that calving in group pens predominated 67.60 per cent no disinfection of calf navels occurred on 11.80 per cent of herds, pooled colostrum was fed on 15.40 per cent and only 73.50 per cent of farms had reserve colostrum stocks, non market waste milk was fed in 64.70 per cent of herds but it was pasteurized in only in 6.80 per cent of herds and acidified in 35.20 per cent of herds, milk replacer was mixed with non market waste milk on 52.90 per cent of farms. Farms unable to give milk to calves by sucking 41.20 per cent, weaning 61.70 per cent starter and concentrated feed 19.9 per cent and lack of housing capacity 18.40 per cent.

Anju and Bajaj (2015) observed that, the activities in the solution at non - zero values have zero dual prices. The supply of DCP, TDN and dry matter supplied by dry roughages were surplus, amounting to 0.17, 3.35 and 1.75 kg respectively with zero dual price. For DCP and TDN similar results were reported by and for pandharpuri buffalo heifers feeding during rabi season. The surplus quantity of DCP, TDN and dry matter supplied by dry roughages indicated that, the least cost combination of feeds and fodder after meeting all the requirements also exceed the DCP, TDN and dry matter supplied by dry roughages by 0.17, 3.35 and 1.75 kg respectively, without any cost implication. It was indicated that for every decreased in

one unit restrictions, cost was reduce by Rs. 0.28, Rs. 0.38, Rs. 0.41 and Rs. 3.75 respectively and vice versa.

Emily and Trevor (2015) reported that there was potential for various nutritional, housing and management factors to impact the learning of feeding behavior early in the life of dairy calves. Recent data suggests that providing forage to calves is important for rumen development, consequent growth and efficiency.

Martinez-Garcia *et al.* (2015) explored whether technology adoption and changes in management practices were associated with farm structure, household and farmer characteristics and to identify processes that may foster productivity and sustainability of small-scale dairy farming in the central high lands of Mexico. Factor analysis identified three factors that explained per cent of the cumulative variance with a Kaiser-Meyer-Olkin coefficient of 0.613.

Sabapara (2015) studied dairy husbandry practices in Surat district of south Gujarat and revealed that majority of respondents (84.67%) followed stall feeding system, while only 18.33 per cent of the respondents followed stall feeding as well as grazing system for their animals. All dairy animal owners (100%) adopted individual feeding system to their animals. Majority of the respondents (95%) fed green/dry fodders as such, while 5.00 per cent of the respondents offered chaffed green/dry fodders to their animals. All the respondents fed concentrates two times in a day to their animals. It was observed that 57.67, 32.33 and 10.00 per cent respondents practiced to feed concentrates after milking, during milking and before milking, respectively.

Tebug *et al.* (2015) reported that feed availability in LB (livestock Based) farms as compared to LCB (livestock-crop based) farms. A majority of farmers (98.50%) perceived calf morbidity and mortality as a major challenge in calf rearing. Mean while, labour was readily available to assist with calf rearing in 88.24 per cent of farms in both systems. Capacity building on improve husbandry practices could enhance calf survival and productivity in surveyed farms.

Tesfay and Gangwar (2015) surveyed in urban and peri-urban areas. The veterinary services was significantly ($P < 0.05$) better in urban areas than the peri-urban areas. About 44 per cent of the peri-urban dairy farmers trek their dairy cattle more than 6 km in searching veterinary services. Waste management was relatively problematic in urban areas (36.25%) as compared to the peri-urban areas (13.75%). There was also promising urban-peri-urban linkage in dairy product and by-product

supply. Therefore, an appropriate feeding, watering, health management, housing and manure utilization could be the management options to improve the existing problems.

Patel *et al.* (2016) observed that majority of respondent supplied on an average 01.53 kg concentrate, 02.89 kg green fodder and 03.24 kg dry fodder per animal. Concentrate, dry fodder and green fodder were essential to fulfill nutritive value for animals. It was observed that the animals were not supplied proper quantity of feed materials.

2.2. Constraints in livestock rearing

Gangasagare *et al.* (2009) mentioned in their studies that adaptation of various animal husbandry practices such as special care of crossbred animals, cooling arrangement during summer, washing crossbred animals during summer, vaccination to dairy animals, Significantly higher number of dairy farmers did not adapt the practices of de-worming (185 out of 230), controlling the ecto-parasites (193 out of 230) and removal of old debris (165 out of 230). A. I., animal insurance and use of milking machine. The data on use of milking machine were subjected to (z - test). The results revealed that none of the dairy farmers adapted machine milking ($P>0.05$), the main reason was its cost and maintenance; 56.44 per cent of the respondents, conveyed their constraints as high cost of concentrate and other feeds; while 50.66 per cent respondents stated high cost of high yielding breeds of animals as their constraint while 43.11 per cent of the farmers responded high cost of medicine as their constraint.

Paul and Chakravarty (2009) results of the study show that lack of maintenance of resource inventory, provision of funds mostly by the end of the financial year, non-availability of committed cash and kind in matching amount at the appropriate time, sub-standard quality of production inputs, inadequate availability of technical and non technical man-power, inadequate and lack of timely availability of production inputs, lack of technical know-how, lack of viable and need oriented projects, insufficient computer facilities etc. were among the most important perceived constraints.

Rani *et al.* (2009) observed that non remunerative price of milk, high cost of concentrates, reduction in milk yield due to disease, inadequate knowledge of vaccination schedule and control of diseases, high cost of milch animals, inadequate

knowledge of scientific housing and recommended management practices where the major constraints faced by the dairy farmers in dairy farming.

Dhaka *et al.* (2011) conducted a survey on 250 farmers in Bundi district of Rajasthan and revealed that the major constraints in limiting the productivity of livestock were inadequate knowledge 76.25 per cent, inadequate availability and poor quality of feed and fodder 69.15 per cent, high incidence of disease 68.35 per cent, poor genetic potential of animals 75.40 per cent, non availability of support services in time 62.25 per cent, poor extension support 35.45 per cent, long calving intervals 36.65 per cent and repeat breeding 28.50 per cent and to reduce this constraints of livestock productivity informal discussion with scientist, key informants and progressive farmers, several steps has been suggested that could be taken up to enhance the productivity of animals as far as breed improvement concerns local non descript animals, improvement through crossbreeding with superior germplasm and artificial insemination.

Kumar *et al.* (2012) revealed that the major constraints involved in scientific dairy farming were non functional artificial insemination center, timely availability and non availability of vaccine and veterinary medicine in government hospitals, repeat breeding, preferences to cash or food crops rather than the fodder crops unawareness about recommended feeding practices, non availability of high yielding varieties of fodder seeds, poor availability and high cost of compound feed, mineral mixture, lack of veterinary doctors and lack of knowledge about scientific management and health care of dairy animals practices were perceived as the important constraint in adopting improved dairy farming practices by majority of respondents. They suggested that to minimise these constraints used appropriate strategy should be formulated by authority of Krishi Vigyan Kendra, Bank with help of district/block veterinary department, district development department of state government or with the other agencies engaged in dairy development in the area for transfer of technology relevant to scientific dairy farming practices in the area.

Mohapatra *et al.* (2012) too had observed that high cost of concentrate 96.67 per cent and lack of facilities for growing green fodder 62.5 per cent were the major constraints faced by the tribal dairy farmers of Mayurbhanj district of Odisha.

Ravi *et al.* (2012) studied constraints faced by tribal farmers with Garret's scores as well as the ranks in feeding, breeding, production and health management practices. Feeding of dairy animals, non availability of cattle feed, high

cost of concentrates, high cost of green fodder, high cost of dry fodder, lack of knowledge about mineral mixture were found to be second, third, fourth, fifth, sixth and seventh constraints, respectively. Proper/scientific feeding of dairy animals, repeat breeding lack of pedigree bulls for natural services, low milk productivity of animals and lack of scientific housing.

Sabpara *et al.* (2012) found that constraints related to dairy animals were high cost of feed (91.00 per cent) followed non availability of green fodder round the year 89.00 per cent, lack of knowledge of balanced ration 45.50 per cent, lack of knowledge about silage preparation 30.00 per cent, lack of knowledge to improve nutritive value of 19.00 per cent, lack of availability of fodder crop seed 5.50 per cent. They further reported that to minimise these constraints the animal husbandry department can provide financial credit at lower interest to farmers through village co-operative societies or other appropriate agencies to uplift socio-economic status of this resources poor people through dairying.

Vidyasagar *et al.* (2012) studied the constraints encountered in rearing livestock in dry land areas of Tamil Nadu and reported that major constraints of cattle and buffalo owners were water scarcity, lack of veterinary aid, lack of green fodder availability.

Chaudhary *et al.* (2013) conducted study in Rajasthan with selection of Bikaner district with the sample size of 225 respondents, rearing cattle for last 5 years to ascertain the adoption level of recommended cattle management practices by farm women and to identify constraints in adoption of modern cattle management practices. It was found that majority of the respondents had medium level of adoption. The highest extent of adoption was found in health care 80.89 per cent in medium level of category whereas low level of adoption was observed in management practices 5.33 per cent. Ten independent variables were included in the study i.e. age, education, land holding, caste, monthly income, size of herd, mass media exposure, extension contact, social participation and urban contact of the respondents which had positive and significant relationship with adoption of recommended practices of cattle management.

Kolekar *et al.* (2013) observed that some constraints like poor service delivery by firm (40.8), lack of quality inputs (37.5), cheating by an agency (34.8), scarcity of labour (32.3), lower price for milk produce (30) were being faced by contract dairy farmers. Which states that contract farming has several disadvantages

like poor extension services, low prices to farmers due to haphazard pricing of the produce, inherent higher risk to cultivators, frequent delays in payment, weak bargaining power of farmers, and sole dependence on companies for inputs as also credit.

Patel *et al.* (2013) reported that constraints related to feeding of dairy animals were high cost of feed 90 per cent, followed by non-availability of green fodder round the year 73.75 per cent, lack of knowledge of balanced ration 72.50 per cent, lack of awareness about treatment of poor quality straw to improve its nutritive value 25.00 per cent and lack of knowledge about silage preparation 15.00 per cent.

Surkar *et al.* (2014) collected that from 120 dairy farmers randomly selected from 12 villages through interview schedule, analyzed and results were interpreted. Major constraints recorded were, unavailability of chilling facilities at collection centre, insufficient knowledge of farmers in terms of milk quality, lower price for milk produce, lack of milk testing and animal screening facilities and unavailability of nutritious feed. Lack of co-operative societies and financial support to encourage scientific dairy farming were other major constraints faced by farmers. All these constraints may lay significant impact on milk production in terms of quality and quantity. For overall development of dairy sector in this area dissemination of knowledge, transfer of technology and role of dairy cooperatives would be crucial.

Yadav *et al.* (2014) results indicated that lack of grazing pasture land was most severe constraint having Rank Based Quotient (RBQ) value 98.34, while high cost and non-availability of cattle feed and feed supplement/mineral mixture in village considered as less severe problems having RBQ value 32.67. Lack of knowledge about balance feeding of livestock, high cost of feed/fodder and lack of knowledge about preservation of feed and fodder were considered as moderately serious problems having RBQ values 78.33, 61.34 and 45.33, respectively.

Ainlawar *et al.* (2015) concluded that, the important constraints reported by cattle rearer were availability of fodder throughout the year and also in the rainy season, shortage of grazing land, getting loan in time and in sufficient amount, in getting veterinary services, getting low price to cattle at selling due to the butchers and middlemen which create the chain. As regards the cost of veterinary aids and concentrates, 76.68 per cent reported about high cost requirement of veterinary aids. 85.00 per cent of the cattle rearers were facing the constraint of high cost requirement for concentrates of cattle.

Nagrale *et al.* (2015) in their study area were asked to rank the each constraint which were analysed using Garret's ranking technique. Lack of availability of green fodder was found as major feeding constraint, low productivity of animal as breeding constraint, low price of liquid milk as marketing constraint, institutional constraint was lack of AI and veterinary facilities and overall major constraint considering all the above categories was lack of availability of green fodder.

Singh *et al.* (2015) studied the constraints faced by farmers in adoption of dairy as an entrepreneurship, 45 commercial dairy farmers of Punjab were selected through stratified random sampling technique and interviewed with a pre-tested questionnaire. The problems associated with adoption of feeding and health care practices were ranked first 61.8 per cent followed by constraints in adoption of milking practices 58.3 per cent, breeding practices 51.0 per cent and housing practices 48.8 per cent. Inadequate facilities of artificial insemination centre 71.1 per cent, high price of concentrate mixture 84.4 per cent, lack of capital for housing 66.7 per cent, low economic gains 80.0 per cent and non-availability of adequate veterinary services 77.8 per cent were major stumbling block in adoption of the improved breeding, feeding, housing, milking and health care practices, respectively.

2.3. Feeding of sugarcane tops for livestock

Deville *et al.* (1979) reported that cane tops silage can be prepared and used as a substitute fodder without affecting animal performance. Silage from cane tops were prepared on a commercial scale using as additives ammonium sulphate and molasses at 5 or 1% respectively. The feeding level was approximately 3% of liveweight (fresh basis). The rest of the ration consisted of molasses with 3% urea fed at approximately 2.5% of liveweight, ant a daily supplement of copra cake 1 kg, fish meal 200 g, and rice bran 500g on Site 1, daily gain was 671 g ant 751 g, ant on Site 2, 566 g ant 580 g for silage ant fresh fodder respectively, the differences being non-significant. The results suggest that the production and utilization of cane tops silage should be considered in Mauritius. However, since cane tops represent the only fodder available in large quantities, large scale silage production should be seriously considered if mauritius is to be self sufficient in meat and milk.

Ffoulkes *et al.* (1979) observed that the measurements of digestibility and voluntary intake were significant increases in try matter intake (DMI) ($P = .03$) when the mixed dicta were compared with the basal diet of chopped cane stalk. These increases were 22 per cent (cane tops), 34 per cent (banana leaf) and 38 per cent

(cassava forage) and since the intake of cane stalk were not affected, were due to the additional forage in these rations. The slight depression of cane stalk intake when cane tops were added was not significant statistically ($P=.50$). Apparent digestibility of dry matter (DM) did not differ significantly between treatments and thus improvements in digestible dry matter intake (DMI). It was estimated that the cane tops, banana leaf and cassava forage provided an intake of about 50, 180 and 200 g CP/d respectively. These quantities of protein seem to be too low to explain the effect of the forages on intake in terms of their supply of by-pass protein to the animal and it is more likely that their main effect may be to improve rumen function.

Wanapat *et al.* (1999) studied the use of urea-treated rice straw (UTRS) and whole sugar cane (WSC) crop as roughage sources for dairy cattle during the dry season. Experiment I, four rumen-fistulated dairy crossbred steers were assigned to receive roughage treatments according to a 4x4 Latin square design: T_1 =urea-treated (5%) rice straw, T_2 =UTRS and WSC at 75:25% DM, T_3 =UTRS and WSC at 25:75 per cent DM, and T_4 =WSC. Experiment II, three rumen fistulated, late lactating multiparous Holstein-Friesian crossbreds were randomly allotted to a 3x3 Latin square design to receive three types of roughages; T_1 =WSC, T_2 =UTRS, T_3 =WSC+UTRS at 50:50 per cent DM. It was found that combination of UTRS and WSC at 75:25 ratio significantly increased DM intake while intake of WSC alone was lowest. Moreover, inclusion of UTRS into WSC enhanced digestibilities. Combination of UTRS with WSC at 50:50 ratio (DM) enhanced DM intake (kg/d) ($p<0.05$) and especially milk yield, milk fat and protein percentages. The findings suggest the combined use of WSC and UTRS improved the feeding values of these roughages for dairy cattle during the dry season.

Kawashima *et al.* (2002) observed that level of methane production of the animals given only chopped sugarcane stalk (CSS) was in the normal range (6.3% of gross energy) the level of the animals given only total mixed ration (TMR) was very low (2.3% of gross energy). The fiber in the TMR was very fine and the digestibility of dry matter (DM) and nitrogen free extract (NFE) of the (TMR) was relatively low. Further study would be required to clarify the effect of sugar on rumen fermentation and degradability of fiber in rumen for efficient use of (CSS) for animal production.

Suksombat *et al.* (2005) showed that chopped whole sugar cane or sugar cane silage can be fed to lactating dairy cows particularly during the shortage of

fresh forage. However the economics of using chopped whole sugar cane or sugar cane silage for dairy cows depends on the costs of sugar cane, harvesting, ensiling and feeding methods and these factors should be considered before using these feeds.

Gendley *et al.* (2008) reported that for maintenance of mature breeding bulls (300 kg body weight) need about 74.64 g DM, 41.06 g TDN and 7.46 g CP per day per kg metabolic body weight. The balances of calcium and phosphorus did not show any significant difference among the groups. It suggests that sugarcane tops (SCT) can be used for the feeding of productive animals after proper protein and energy feeds supplementations.

Riaz *et al.* (2008) planed to evaluate the substitution of sugarcane tops for different conventional feeding regimes in Sahiwal male calves. Nine Sahiwal entire male calves ranging in age of 12-14 months with an average weight of 95 ± 2.12 kg were divided into three groups in a completely randomized design. Berseem (*Trifolium alexandrinum* L.) 80 per cent and wheat straw (*Triticum aestivum* L.) 20 per cent was taken as basal ration (T_0), while in T_1 berseem 75% and sugarcane tops 25%; and in T_2 berseem 80 per cent and oats (*Avena sativa* L.) 20 per cent were used, respectively. The average dry matter intake (DMI) was 2.56, 2.59 and 2.70 kg in T_0 , T_1 and T_2 , respectively. Average daily water intake (DWI) was 1.14, 1.29 and 1.43 L in T_0 , T_1 and T_2 , respectively. Data for DMI and DWI did not show any significant ($P > 0.05$) difference among the various groups. However, the $DMI^{-1} \text{ kg}^{-0.75}$ in calves on different feeding regimes was 0.08, 0.09 and 0.07 kg in T_0 , T_1 and T_2 , respectively. The $DMI^{-1} \text{ kg}^{-0.75}$ showed a significant ($P < 0.05$) difference among the treatments. The feeding regime (T_1) having sugarcane tops proved to be the best ration in terms of economical gain. T_0 having wheat straw showed significantly ($P < 0.05$) poor performance in terms of weight gain as compared to T_1 and T_2 .

Marey *et al.* (2011) the obtained results as increasing both number of knives and speed ratio tends to increase the percentage of short pieces (< 25 mm). While the moisture content of 10.33 gave the highest values of percentage of short pieces. The highest values of cutting and chopper efficiency were obtained at sugarcane bagasse moisture content of 10.33 and speed ratio of 31.3 when using 8 knives. While the maximum chopper productivity recorded at moisture content of 10.33 and speed ratio of 21.14 under 8 knives. The minimum energy requirements of 7.02 kw.h/ton was obtained at moisture content of 10.52 and speed ratio of 20.14 with 2 knives. Decreasing moisture content, increment number of knives and speed ratio

gave more fine bagasse which represent suitable media of fermentation for high quality silage.

Bandeswaran *et al.* (2012) revealed that the sugarcane tops, crop residues, groundnut cake and deoiled rice bran were being fed by majority of the farmers to their dairy cows in the proportions of 51.9, 25.2, 8.1 Therefore, feeding of sugarcane tops in the previous day resulted in maximum energy release within 3 h of feeding in the next day. However, $t_{1/2}$ of N from groundnut cake was 9 h. Hence, groundnut cake was fed 6 h before feeding of sugarcane tops in Evolved Feeding Strategy (EFS). The EFS for sugarcane tops was determined based on $t_{1/2}$ of sugarcane tops organic matter and $t_{1/2}$ of groundnut cake nitrogen and 14.8 per cent, respectively.

Sharma *et al.* (2012) sixteen Murrah buffalo calves of similar age and body weight were divided into four groups randomly of four animals each. The group 1 was fed with 100 per cent sugarcane tops (SCT) (control) and in group 2, 3, 4, the SCT was replaced by 20 per cent, 30 per cent, and 40 per cent concentrate mixture, respectively. After an adaptation period of 21 days on experimental diet, the 1st digestibility trial was conducted. The dry matter (DM), crude protein (CP), ether extract (EE), acid detergent fibre (ADF), neutral detergent fibre (NDF), OM digestibility was higher ($p<0.01$) in the 3rd and 4th group as compared to the 1st group owing to the higher DCP and TDN in the 3rd and 4th group. In the 2nd trial the same animals were used and divided into four groups randomly of four animals in each group. The group 1 was fed with 100 per cent SCT and in group 2, 3 and 4th SCT was replaced by 20, 30, 40 per cent mustard cake to match the field conditions. The DM, CP, EE, ADF, NDF, OM digestibility was higher ($p<0.01$) in the 3rd and 4th group as compared to the 1st group owing to the higher DCP and TDN in the 3rd and 4th group. In both the trials there was no significant difference found in 1st and 2nd group of animals.

Mahala *et al.* (2013) observed in sugar cane tops effectively constituted the large proportion of total mixed ration for fattening calves. This large contribution in diet was reduce the production increased the benefit. Small holders can use sugarcane tops as basal diet or diet for maintenance during dry season.

Alemayehu *et al.* (2014) observed that in urea treatmentsugarcane tops crude protein (CP), acid detergent fibre (ADF), cellulose and acid detergent lignin (ADL) content increased by 127.72, 10.45, 10.75 and 29.25 per cent, respectively. Whereas neutral detergent fibre (NDF) and oxalate content of sugarcane tops (SCT)

was reduced by 6.78 and 52.28 per cent, respectively. There was significant difference ($P<0.05$) in DM, CP, Ash, oxalate, NDF, ADF, ADL and cellulose content of SCT after urea treatment. However, non significant variation ($P>0.05$) was observed in crude fibre (CF), ether extract (EE) and nitrogen free extract (NFE) content of SCT. Urea treatment can considerably reduce the oxalate content of sugarcane top. Besides, it showed significant improvement in proximate nutrients and cell wall constituents of sugarcane top after urea treatment.

Ali *et al.* (2015) observed that urea treatment increased CP concentration from 2.76 per cent in untreated sugar cane tops (UTC) to 11.83 per cent in sugar cane tops (TCT). Dry matter intake (DMI) of SCT was not affected when supplemented with either groundnut cake or sorghum grain. However, supplementation had significantly ($P<0.05$) increased total dry matter intake (DMI) and the nutrient digestibility. Rumen degradation and the degradation characteristics of dry matter were improved by urea treatment.

Kumar *et al.* (2015) observed dressing percentage on pre-slaughter weight or empty body weight basis of lambs fed different levels of sugarcane press mud (SPM) incorporated diets. Likewise carcass weight, carcass length and wholesale cuts appeared to have similar values among groups. The yield of visceral organs, chemical composition and sensory attributes were not statistically affected by inclusion of sugarcane press mud (SPM) in the diets except juiciness of control group meat was significantly ($p<0.05$) higher than treatment group (SP20).

2.4. Adoption of various management practices

Veeranna and Singh (2004) in their studies on attitude and adoption of improved dairy production practices by Lambani Tribe reported that in case of feeding, disease control, breeding, management, majority of dairy farmers were in medium adoption category. For overall adoption 67 per cent of dairy farmers were in medium adoption category followed by 21 per cent in low and 12 per cent in high adoption category. The extent of overall adoption of improved dairy production practices was found to be 66.43 per cent. Individually, the maximum extent of adoption was found in feeding 79.16 per cent followed by disease control 70.58 per cent, breeding 61.69 per cent and general management 58.96 per cent.

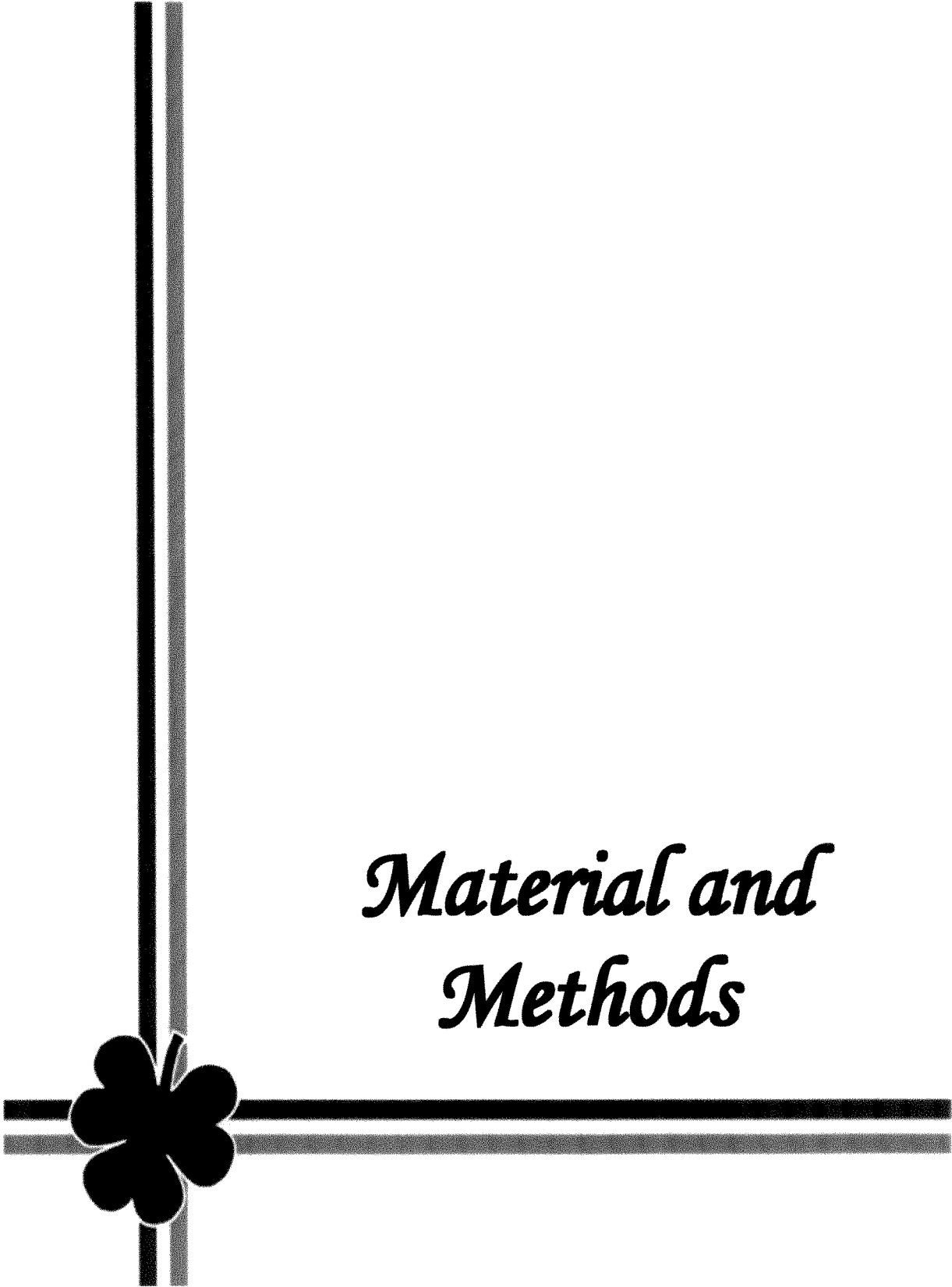
Gautam *et al.* (2007) studied socio-personal correlation for decision-making and adoption of new dairy practices and revealed that the herd size, occupation and social participation with the adoption were positively correlated at the

0.05 per cent level of probability and family education level of probability and family education level of respondent was highly positively correlated with adoption at the 0.01 per cent level of probability while farm size was negatively correlated with the adoption. The relationships between age, caste and family size were not significant with adoption of dairy practices.

Khode *et al.* (2009) in their studies on adoption of improved dairy cattle management practices under vidarbha development programme package observed that majority of farmers (65.12 per cent) had secured medium adoption of improved dairy cattle management practices. While, 18.60 per cent and 16.28 per cent of farmers had low and high adoption of improved dairy cattle management practices respectively.

Aulakh and Sharma (2012) studied adoption of recommended buffalo breeding practices in Punjab and reported that all respondents of all the three categories possessed higher adoption with respect to practice 'record keeping of A-I/Natural service' 78.33 per cent and 'regular watching of buffalo for heat symptoms' 71.11 per cent and hence these practices were ranked at first and second position. Low adoption level was found among all the categories of respondents about 'pregnancy diagnosis' 33.89 per cent, 'regular check up of buffalo during pregnancy' 38.61 per cent and 'adoption of A.I.' 39.44 per cent

Sabapara (2015) studied dairy husbandry practices in Surat district of south Gujarat and reported that 62.33 per cent, 57 per cent, 62.34 per cent, 68.33 per cent of farmers had medium level of adoption in feeding, breeding, milking and health care management practices respectively.



Material and Methods

CHAPTER - III

MATERIALS AND METHODS

The details of the materials used and the methods followed in conducting the present investigation are presented in this chapter under appropriate heads.

3.1. General information about Latur district

3.1.1. Geographical situation

The Latur District is in the south-eastern part of the Maharashtra state. Latur town is situated on the 18.7° latitude and 73.25° longitude. The district is situated on the Maharashtra Karnataka boundary. On the eastern side of the Latur is Bidar district of Karnataka, whereas Nanded is on the northeast, Parbhani on the northern side, Beed on the Northwest and Osmanabad on the western and southern side. The entire district of Latur is situated on the Balaghat plateau, 540 to 638 mtrs from the mean sea level. The central part of the district lies in the Manjra River basin, while the southern area is in the Terna River basin. (Ministry of MSME, Govt. of India)

3.1.2. Climate and Rainfall

The nearby meteorological observatory has been considered as representative for the district. The winter season commences by the end of November when night temperature decreases rapidly. December is generally the coldest month with the mean daily maximum temperature at 29.5°C and the mean daily minimum temperature at about 15°C. On some occasions the minimum temperature drops down to 4 or 5°C due to western disturbances.

May is generally the hottest month with temperature at 40°C and mean daily minimum temperature 27 °C. In summer the humidity is less than 25 per cent. The normal annual rainfall over the district varies from 650 to 800mm and it increases from southwest to northeast. It is minimum in the southern part of the district around Nilanga and increases towards north east and reaches a maximum around Udgir. The average annual rainfall for 2008-2011 was 761mm.

3.1.3. Soil and topography

The district can be divided into the two zones based on soil characteristics i.e., the first zone which occurs in eastern part of the district comprising of Ahmedpur, Udgir and parts of Latur and Ausa talukas. It consists of

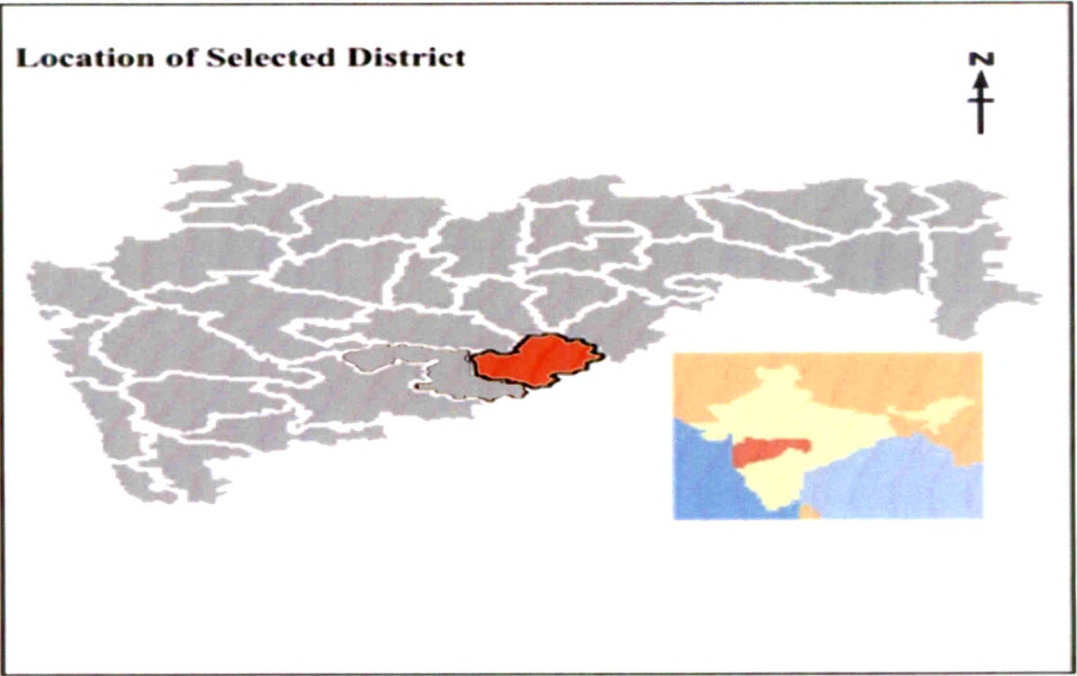


Fig 3.1. Map of Maharashtra state showing Latur district



Fig 3. 2. Map of Latur district showing selected sugarcane pockets area

light and light medium soil of inferior type. They are not retentive of moisture and are therefore suitable for the cultivation of *kharif* crops only. The soil in some parts of Nilanga taluka is of Lateritic type and the second zone which occurs in western part of the district comprising parts of Latur and Ausa talukas. They are heavy deep black cotton soils. Owing to the peculiarity of the soil, both *kharif* and *rabi* crops are cultivated in this zone.

3.1.4. Cropping Pattern

In Latur district, about 8.28 per cent of area is under irrigation to total cultivated area (6.14 lakh hectares). This district leads in cultivation of soybean and tur. In *kharif*, jowar, soybean, tur, green gram and black gram are major crops. In the winter season, wheat, gram, potato, sunflower and *rabi* jowar are major crops. In the summer season under irrigated condition, sugarcane and groundnut crops are taken.

3.1.5. Livestock population

Livestock, though non-descript, continues to be a valuable possession of the agriculturists in the district. The agricultural economy is also dependent on the cattle. The agricultural operations such as ploughing, harrowing, etc. including irrigation and threshing are done by the draught animals. The livestock broadly includes bovine (cattle and buffaloes) ovine (sheep and goats).

Bullocks are kept as draft purpose animal or as breeding animals. Cows are maintained for milk production. Sheep are kept for meat, manure and wool purpose. While goats are kept for milk, meat and manure purpose. Species wise livestock population of the district is given as follows

Table 3.1 Species wise livestock population of the Latur district

(Livestock census, 2012)

Sr. No.	Species	Livestock Population
1	Cow	1642547000
2	Buffalo	683112000
3	Sheep	39007000
4	Goat	665787000
5	Poultry	929771000

3.1.6. Fodder

Fodder consists of sugarcane tops, gajraj grass, stalk of jowar, maize that are tied in bundles, kadul, ghas, sarmad, husk of pulses, leaves and stalks of pulse crops, groundnut straw.

At many places jowar and green maize is grown principally for fodder wherever irrigation facilities are available. In addition to all these above mentioned, cakes of groundnuts and cotton seed are also utilised as source of conc. feed and are supposed to be the best food for livestock.

3.2. Information about place of work

The data for present investigation entitled “Feeding and Management Practices Adopted by Cattle Owners in Sugarcane Pockets of Latur District” were collected from different cattle owners, specially who are rearing the cattle and belonging from sugarcane pockets in Latur district of Maharashtra state. A comprehensive questionnaire was prepared to collect information by personal interview with individual dairy farmers. A comprehensive questionnaire was prepared to collect information by personal interview from individual cattle owners.

3.3. METHODOLOGY

The details of the materials and the methods followed in conducting the present investigation are presented as follow

3.3.1 Information about place of work

The data for the present investigation were be collected from different cattle owners, specially who are rearing the cattle in sugarcane pocket of Latur district of Maharashtra state. Latur district was considered for study as representative area of sugarcane growers having four sugar factories i.e. Manjra Sahakari Sakhar Karkhana Chincholiraowadi, Vikas Sahakari Sakhar Karkhana, Nivali, Rena Sahakari Sakhar Karkhana, Nivada and Jagruti Sugar factorie Talegaon.

3.3.2. Methods of sampling

The data obtained for the study was collected by multistage random sampling technique.

a) Selection of sugarcane industrial pockets

The multistage sampling technique was used to select farmers and village. The four sugarcane industrial pockets as mentioned above were selected from Latur district for study.

b) Selection of villages and farmers

Random selection of twenty villages was made from four selected sugarcane industrial pockets. (five from each sugar factory) .

Table 3.2 Status of surveyed area in sugarcane pocket of Latur distric

Block	Name of sugar Industry	Name of village	Number of cases investigated
B ₁	Vikas Sahakari Sakhar Karkhana, Nivali, Tq. Latur Dist. Latur	Nivali	10
		Murud Akola	10
		Borgaon (Kale)	10
		Dhakani	10
		Ekurga	10
B ₂	Manjra Sahakari Sakhar Karkhana Chincholiraowadi, Tq. Latur Dist. Latur	Chincholiraowadi	10
		Aalmala	10
		Gangapur	10
		Harangul	10
		Vasngaon	10
B ₃	Jagruti Sugar factorie Talegaon, Tq. Deoni Dist. Latur	Nalegaon	10
		Aashta	10
		Mohdal	10
		Gharni	10
		Ambulga	10
B ₄	Rena Sahakari Sakhar Karkhana, Nivada, Tq. Renapur Dist. Latur	Niwada	10
		Shera	10
		Poharegaon	10
		Darji-Borgaon	10
		Shindgaon	10
Total			200

Random selection of five villages from each sugarcane pocket, thus twenty villages were finalized from four selected sugarcane industry pockets. Ten numbers of farmers were randomly selected from each village comprised 200 farmers from twenty villages were considered for survey study. The data in respect of enumeration of cattle, existing feeding and management practices, production performance of cattle by personal interview method by using well designed questionnaires-1 (appendix-I) were collected.

3.4. Classification of farmers

3.4.1. According to farm size

Two hundred respondents were randomly selected @ 10 per village. After the selection of respondents they were post-classified into the groups of their different categories of their farm size. Farm size means number of hectares of agricultural land possessed by the farmers. It refers to actual land possessed by the

respondents family in hectares, the respondents were categorized in to 5 categories according to size of land holding.

Table 3.3 Classification of farmer on the basis of size of landholding

Sr. No.	Category	Size of land holding
1	Landless labour	Nil
2	Marginal farmer	Less than 1 ha.
3	Small farmer	1- 2 ha.
4	Medium farmer	2- 5 ha.
5	Large farmer	More than 5 ha.

3.4.2. According to size of cattle population

The respondents were further categorized into 3 groups according to number of animal kept by them.

Table 3.4 Classification of farmer on the basis of cattle population size

Sr. No.	Category	No. of Animals (Herd size)
1	Small	1- 5
2	Medium	6- 10
3	Large	More than 10

3.5. Evalution of adoption level of management practices

Management practices like feeding, milking and health care practices followed by animal owners were collected through questionnaires-1 and their adoption level was evaluated by using questionnaires-2 (appendix-II) simultaniously.

3.5.1. Adoption of management practices

The adoption is the degree to which a respondent actually adopts a practice for the purpose of measurement of extent of adoption of dairy innovations. A simple adoption scale developed by Sharma and Sohil (1987) was used in the present study with some modification. The scale contained total twenty one practices i.e. seven practices from each category perticularly feeding, health care and milking practices. Against each of the practices, there were three columns representing 'continue/regular adoption', 'occasionally adoption' and 'not adoption' with weightage of 2, 1 and 0, respectively. The minimum and maximum score for each

practice of a respondent could get on this scale was 0 and 42, respectively. The total score obtained by individual respondent was calculated with the help of mean ($\bar{X}$) and standard deviation (S.D.). The respondents were categorized as low (Below $\bar{X} - \text{S.D.}$), medium ($\bar{X} \pm \text{S.D.}$) and high (Above $\bar{X} + \text{S.D.}$) with respect to their extent of adoption level for various practices and overall adoption index was calculated using following formula

$$\text{Adoption index} = \frac{\text{Actual score}}{\text{Total score allotted}} \times 100$$

3.6. Statistical method

The data collected were classified and tabulated as per the objective concerned and simple tabular analysis were followed for analyzing data, where the comparison were redundant only frequency and percentages were estimated (Panse and Sukhatme, 1967).

3.6.1. Percentage

Simple comparison was made on the basis of percentage.

3.6.2. Mean ($\bar{X}$)

It was obtained by dividing the sum of individual value by the total number of animal owners.

$$\text{Mean } (\bar{X}) = \sum X_i / n$$

Where, $\bar{X}$ = Mean of the sample

$\sum X_i$ = Sum of all the observations

n = Total number of the respondents

3.6.3. Standard deviation

Standard deviation is the root mean square of the deviation from the arithmetic mean.

$$\text{S.D.} = \sqrt{\frac{\sum (X_i - \bar{X})^2}{n-1}}$$

Where, S.D. = Standard deviation.

$\sum$ = Summation.

X_i = Individual score

$\bar{X}$ = Mean.

n = Total number of the respondents.

3.6.4. Mean score

It was obtained by total number of score divided by the total number of animal owners.

12.5.5. Correlation coefficient(r)

The Pearson's product moment method suggested by Chandel (1998) for computing correlation coefficient(r) was used to study the relationship between independent variable and dependent variable. The correlation coefficient gives two kinds of information:

- (i) Indication of magnitude of the relationship, and
- (ii) Information about the direction for the relationship (whether positive or negative)

For computing the Pearson's product moment correlation coefficient following formula was used

$$r = \frac{\sum xy - \frac{\sum x - \sum y}{n}}{\sqrt{\left[\sum X^2 - \frac{(\sum X)^2}{n} \right] \left[\sum Y^2 - \frac{(\sum Y)^2}{n} \right]}}$$

Where, r = Correlation coefficient

X = Independent variables

Y = Dependent variable

$\sum XY$ = Sum of product of the deviation of X and Y from their mean.

$\sum X^2$ = Sum of square of the deviation of X from their mean.

$\sum Y^2$ = Sum of square of the deviation of Y from their mean.

n = number of observations.



Results and Discussion

CHAPTER - IV

RESULTS AND DISCUSSION

The research entitled “Feeding and Management Practices Adopted by Cattle Owners in Sugarcane Pockets of Latur District” was carried out during the year 2015-2016. Results obtained are presented and discussed in the light of research work conducted so far in this chapter under following heads.

4.1. Socio-economic status and available resources of farmers

4.2. Enumeration of cattle

4.3. Feeding and management practices

4.4. Constraints faced by cattle owners

4.5. Gap between existing practices over recommended practices

4.6. Adoption of various management practices by cattle owners

4.7. Ways and means to improve the feeding and management practices

4.1. Socio-economic status and available resources of farmers

4.1.1. Distribution of respondents according to their socio-economic status

The socio-economic status of farmers in surveyed area of sugarcane pockets of Latur district regarding age, education, family size and cropping pattern are given in table 4.1.

It is revealed from table 4.1 that the maximum number of respondents i.e. 56.00 per cent were from middle age group followed by 25.00 and 19.00 per cent of the respondents were from old age and young age group, respectively. It indicates that the cattle owners from middle age group more interested in cattle keeping as compared to other groups. It may be due to their uncover expanses of this group through agriculture farming. Whereas young due to interest in non-farming activities and old group due to their health is less involvement in cattle rearing. The present result are well supported by the finding of Sabapara (2015) observed that majority of the farmers belongs to middle age group (43.67 per cent).

As regards with education, the respondents were found maximum under illiterate (28.00%), minimum under college level (19.50%) and primary and secondary education in 30.50 and 22.00 per cent, respectively. Similar result observed by Mande and Thombre (2009) noticed that, majority of the farmers (53.33 per cent) had obtained primary education, whereas 11.66 per cent of them had college level education. Only 21.67 per cent people had higher secondary education and 13.33 per

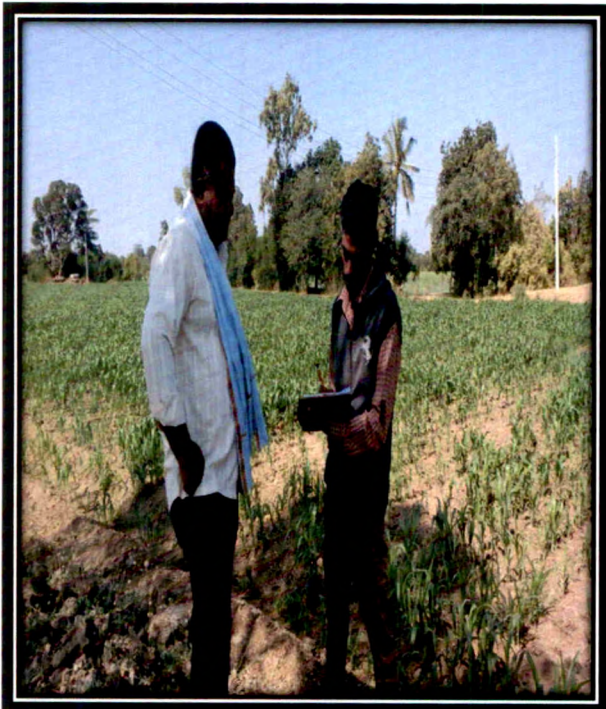
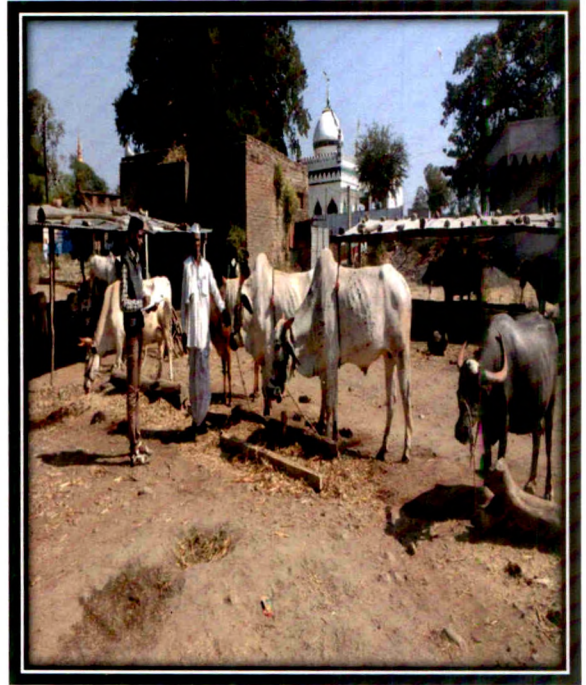
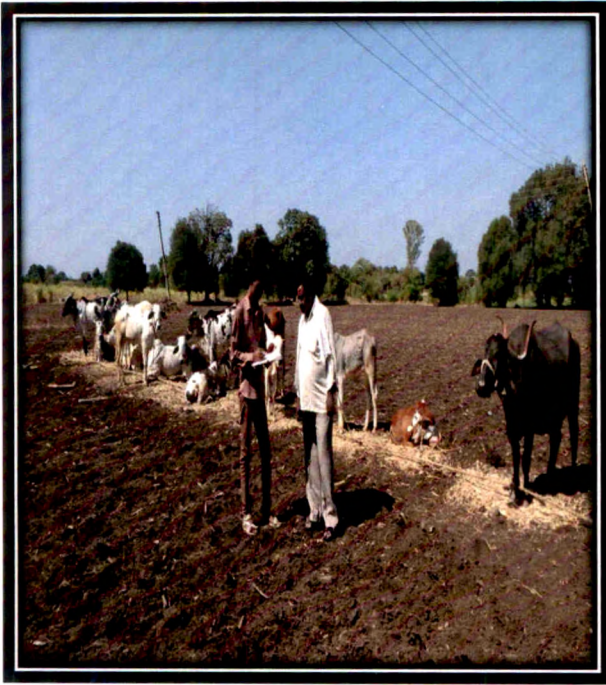


Plate 4.1 Interview with farmers at the time of data collection in surveyed area of sugarcane pockets of Latur district.

cent of respondents were illiterate and also Patel *et al.* (2013) observed that majority of the farmers (41 per cent) had primary level education followed by secondary (35 per cent).

The family size in surveyed area revealed that majority of the farmers belongs to small family 48.50 per cent having (1-5 members) followed by 40 per cent belongs to medium family (5-8 members) and 11.50 per cent of large family size (more than 8). Present finding is similar to by Khode *et al.* (2009). Who observed that majority of the farmers (68.61 per cent) belongs to small family followed by medium family size (26.74 per cent).

Table 4.1. Socio-economic status of farmers surveyed in sugarcane pockets of Latur district

Sr. No.	Characteristics/ Categories	Respondents	
		Number	Percentage
1	Age		
	a) Young age (20 to 35 years)	38	19.00
	b) Middle age (36 to 50 years)	112	56.00
	c) Old age (above 50 years)	50	25.00
2	Education		
	a) Illiterate (can't read and write)	56	28.00
	b) Primary (1 st to 7 th std)	61	30.50
	c) Secondary (8 th to 12 th std)	44	22.00
	d) Above (college level)	39	19.50
3	Family Size		
	a) Small (1-5 members)	97	48.50
	b) Medium (5-8 members)	80	40.00
	c) Large (More than 8 members)	23	11.50
4	Cropping pattern		
	a) Sugarcane + other crops	74	38.34
	b) other crops	119	61.65

The sugarcane growers were 38.34 per cent only and other crop grown by 61.65 per cent farmer in surveyed area. It was expected that more per cent farmer should be cane grower as the surveyed area selected for study came under sugarcane pockets area. The expectation was false might be due to random selection of farmer or only considered the cattle owners for survey. The results of present study in respect to socioeconomic survey of farmers are in agreement with the finding of Patel *et al.* (2014).

4.1.2. Distribution of the cattle owners according to land holding

In order to determine existing management practices adopted by different farmers, the farmers were distributed and categorized as per their land holding and presented in table no 4.2 to conclude and correlate with their land holding. This category was used to present the management practice in adopted by farmers in each categories of farmers by percentage and frequency.

It was observed from table 4.2 that the maximum cattle owners 59.00 per cent having land holding 2-5 ha. followed by small farmers (21.50%), marginal farmers (09.50%), large farmers (6.50%) and minimum was landless owners (3.50%). It indicates that more than near about all farmers (96.50%) having land in which 38.34 per cent farmers grown sugarcane. The sugar cane grower farmers number was less may be due to the less land availability, irrigation facility. Similar results were reported by Patel *et al.* (2013) that 37.50 per cent farmers had small land holdings.

Table 4.2. Distribution of the cattle owners according to land holding

Sr. No.	Category	B ₁	B ₂	B ₃	B ₄	Total	Per cent
1	Marginal farmers (< 1 ha)	04	09	03	03	19	09.50
2	Small farmers (1 to 2 ha)	10	08	11	14	43	21.50
3	Medium farmer (2 to 5 ha)	34	25	33	26	118	59.00
4	Large farmers (Above 5 ha)	01	04	03	05	13	06.50
5	Landless owners	01	04	00	02	07	03.50
	Total	50	50	50	50	200	100

4.1.3. Distribution of farmers according to number of cattle

It was observed from table 4.3 that 55.50 per cent of the farmers having small herd size (1 to 5 animals), 36.50 per cent respondents were medium herd size (6 to 10 animals) and 08.00 per cent of the respondents were possessing large herd size (more than 10 animals) indicate that animal rearing capacity are not related to land holding because land less farmer also maintain the animal and contributed Indian livestock strength. These findings were well supported by Mande and Thombre (2009) and Sabapara (2015).

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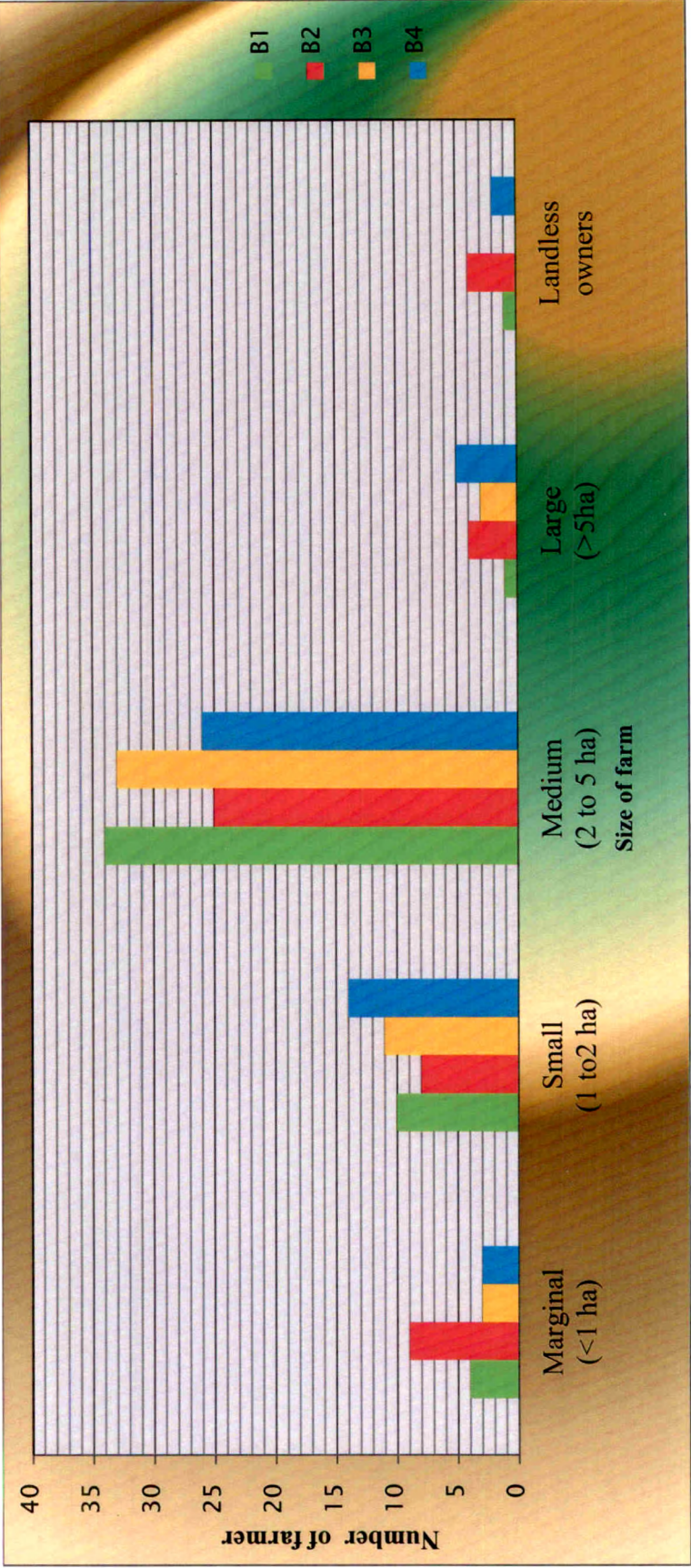


Fig. 4.1. Distribution of the cattle owners according to land holding

Table 4.3. Distribution of farmers according to herd size

Sr. No.	No. of animals	B ₁	B ₂	B ₃	B ₄	Total	Per cent
1	Small (1 to 5)	21	33	27	30	111	55.50
2	Medium (6 to 10)	23	15	18	17	73	36.50
3	Large (Above10)	06	02	05	03	16	08.00
	Total	50	50	50	50	200	100.00

4.2 Enumeration of cattle**4.2.1. Enumeration of cattle population in terms age and sex**

The age wise and sex wise population in surveyed villages of Latur district is presented in table 4.4 separately for indigenous and crossbred cattle.

Total 87.06 per cent indigenous cattle (IC) and 12.93 per cent crossbred cattle were observed in surveyed area. Out of total strength (1314), male and female population was 801 and 513, respectively. The age and sex wise population of indigenous and crossbred cattle of Latur district indicate that, the comparative population of female was higher in both indigenous and crossbred categories. It means farmers are interested more in milch type animal than male animals used for farming as bullocks. This may be due to the mechanization in farming.

Table 4.4. Age and sex wise distribution of cattle in surveyed area of sugarcane pocket

Cattle	Up to 1 year		1-3 year		Above 3 years			Total male	Total female	Grand Total
	Male	Female	Male	Female	Male	Female				
						In Milk	Dry			
Indigenous	111 (23.41)	146 (21.79)	112 (23.62)	92 (13.73)	251 (52.95)	325 (48.50)	107 (15.97)	474 (41.43)	670 (58.56)	1144 (87.06)
Crossbred	17 (43.58)	28 (21.37)	14 (35.89)	12 (09.16)	08 (20.51)	69 (52.67)	22 (16.79)	39 (22.94)	131 (77.05)	170 (12.93)
Total								513	801	1314

The populations of indigenous male up to 1 year, 1-3 year and above 3 years were 23.41, 23.62 and 52.95 per cent as against the female 21.79, 13.73 and 64.47 per cent (48.50% milking and 15.97% dry). The corresponding figures of crossbred cattles were 43.58, 35.89 and 20.51 per cent as against the female 21.37,

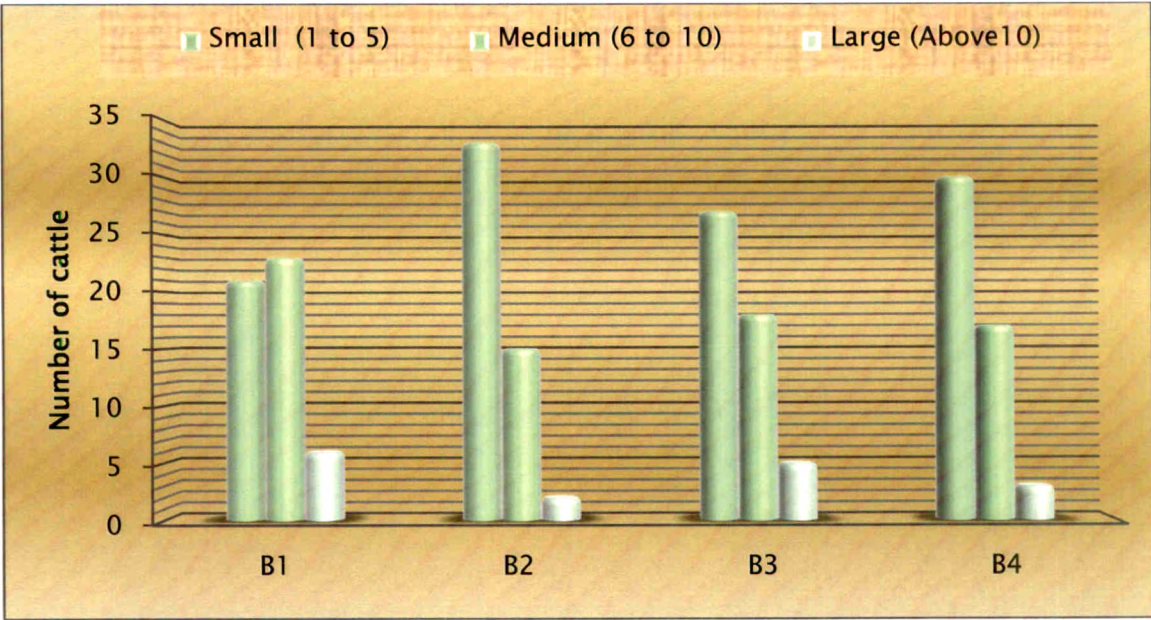


Fig. 4.2. Distribution of the farmers according to number of cattle kept on their farm

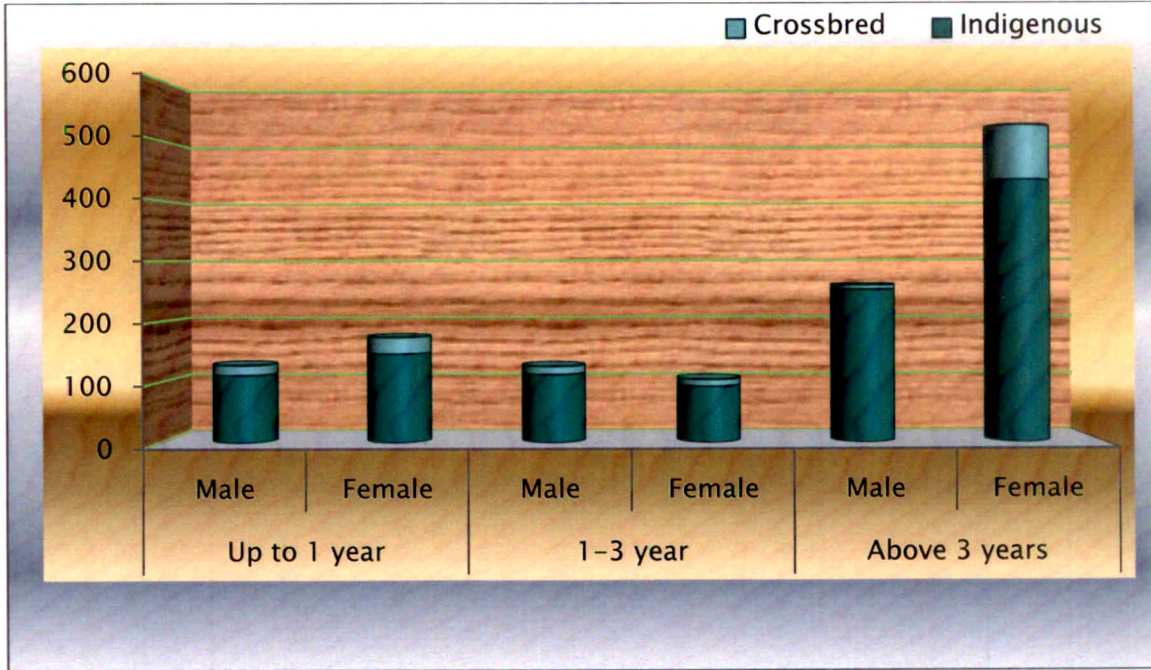


Fig 4.3. Age and sex wise enumeration of cattle population in surveyed area

9.16 and 69.46 per cent (52.67% milking and 16.79% dry). In adult, more than sixty per cent female were observed in milking.

4.2.2. Enumeration of cattle in terms of block

The indigenous and crossbred cattle were enumerated from the selected villages under surveyed sugarcane pockets area. The data collected is tabulated in table 4.5.

Table 4.5. Block wise population of indigenous and crossbred cattle

Cattle	B ₁		B ₂		B ₃		B ₄		Total male	Total female	Grand total
	Male	Female	Male	Female	Male	Female	Male	Female			
Indigenous	137 (28.90)	234 (34.92)	88 (18.56)	144 (21.49)	124 (26.16)	147 (21.94)	125 (26.37)	145 (21.64)	474 (41.43)	670 (58.56)	1144 (87.06)
Crossbred	12 (30.76)	55 (41.98)	11 (28.20)	21 (16.03)	11 (28.20)	28 (21.37)	05 (12.82)	27 (20.61)	39 (22.94)	131 (77.05)	170 (12.93)
Total									513	801	1314

(Figures in parenthesis are percentage to total)

It is revealed that more indigenous cattle population was observed under Block I followed by III, IV and II. Whereas, in crossbred cattle, Block I than III and II and IV are same. It was also revealed that female population in both indigenous as well as crossbred was observed more compared to male in all sugarcane pockets this might be due to the availability sugarcane tops as green fodder for milch animals, interest of farmer in dairy business and spare time for animal rearing as compared to other cropping pattern. The total percentage of indigenous and crossbred male in the population was 41.43 and 22.94 per cent. While, that the female was 58.56 and 77.05 per cent.

4.2.3. Purpose and distribution of cattle rearing of surveyed area

Generally the farmers reared cattle for different purpose as per their need, resources and market demand. The data on this aspect is presented in table 4.6. It was observed that the total landless farmers used cattle for milk production followed by 73.68 per cent of marginal, 69.76 per cent of small, 68.64 per cent medium and 46.15 per cent of large farmer. It is observed from table no. 4.6 that as the land holding is increased the interest of milch animal rearing was decreased. It agreed with the statement that the contribution of India's milk production more contributed by small and landless cattle owners. It was observed that the used for agriculture operation by marginal, small, medium and large farmer as 26.31, 27.90,

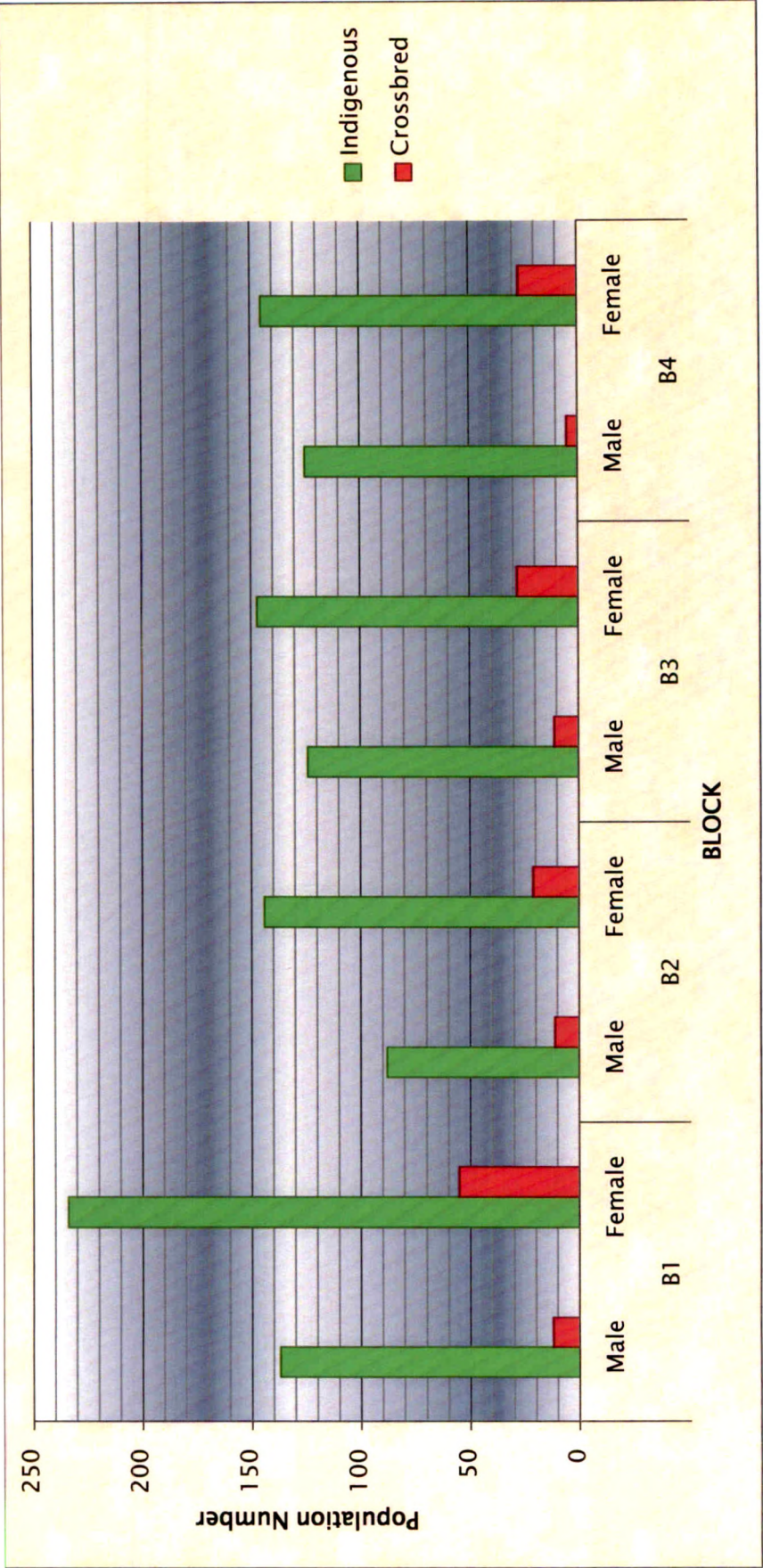


Fig. 4.4. Block wise population of indigenous and crossbred cattle

29.66 and 53.84 per cent, respectively whereas, breeding bull were used by small and medium farmers as 2.32 and 1.69 per cent, respectively.

Table 4.6. Purpose and distribution of cattle owners rearing cattle in surveyed area (N =200)

Sr. No.	Component	Landless owners	Marginal farmers	Small farmers	Medium Farmer	Large farmers	Total
1	Milk production	07 (100)	14 (73.68)	30 (69.76)	81 (68.64)	06 (46.15)	138 (69.00)
2	Agriculture operation	-	05 (26.31)	12 (27.90)	35 (29.66)	07 (53.84)	59 (29.50)
3	Breeding	-	-	01 (02.32)	02 (01.69)	-	03 (01.50)

(Figures in parenthesis shows percentage of respective farmers)

4.3. Feeding and management practices

It is neediness to emphasis the importance of feed and fodder for milk production. Apart from the genetic capabilities of the animals, the milk production in cattle goes in response with nature and the quantities of the feeds and fodder allowed to them. So that it was essential to evaluate the present status of feeding practices adopted by the farmer on their own farm.

4.3.1. Feeding Practices

Information regarding the feeding practices adopted in different categories of farmer is presented in table 4.7.

It was observed from table 4.7 that, the maximum number of farmers used grazing + stall feeding 73.00 per cent and remaining used stall feeding 27.00 per cent. Manohar *et al.* (2014) observed that 87.50 per cent animal owners grazed their animals. Supply of fodder in surveyed area was found 69.23 per cent inadequate and only 24.00 per cent farmers had adequate fodder supply. The positive effect of farmer size on fodder supply was found as large farmer 69.23, medium farmers 25.42 per cent, marginal farmer 21.05 per cent and small farmers 11.62 per cent availed fodder supply. The 100 per cent supply of sugarcane tops as fodder was observed separately in all categories of respondents. Majority of respondents used sugarcane tops as fodder for all type of animal 63.00 per cent. The availability/production of fodder by farmers in surveyed area was observed more in case of large farmers 92.30 per cent followed by medium farmer 90.67 per cent, small farmers 79.06 per cent and marginal farmers 31.57 per cent and then no fodder production by the landless cattle owners.

Table 4.7. Feeding status followed in sugarcane pockets of Latur district (N =200)

Sr. No	Component	Landless owners	Marginal Farmers	Small farmers	Medium farmer	Large farmers	Total
1	Feeding systems						
i	Grazing	-	-	-	-	-	-
ii	Stall Feeding	01 (14.28)	07 (36.84)	17 (39.53)	24 (20.33)	05 (38.56)	54 (27.00)
iii	Grazing + stall feeding	06 (85.71)	12 (63.15)	26 (60.46)	94 (74.66)	08 (61.53)	146 (73.00)
2	Supply of fodder						
i	Adequate	-	04 (21.05)	05 (11.62)	30 (25.42)	09 (69.23)	48 (24.00)
ii	Inadequate	07 (100)	15 (78.94)	38 (88.37)	88 (74.57)	04 (30.76)	152 (76.00)
3	Use of sugarcane tops as fodder						
i	Separately	07 (100)	19 (100)	43 (100)	118 (100)	13 (100)	200 (100)
ii	Mixed with other feed	-	-	-	-	-	-
4	Type of animal feed with sugarcane tops						
i	All type animal	05 (71.42)	12 (63.15)	26 (60.46)	71 (60.16)	12 (92.30)	126 (63.00)
ii	Milch	02 (28.57)	02 (10.52)	05 (11.62)	16 (13.55)	01 (07.69)	26 (13.00)
iii	Dry	-	01 (05.26)	03 (06.97)	07 (05.93)	-	11 (05.50)
iv	Bullock	-	04 (21.05)	09 (20.93)	24 (20.33)	-	37 (18.50)
5	Source of roughages						
i	Produced on own farm	-	06 (31.57)	34 (79.06)	107 (90.67)	12 (92.30)	159 (79.50)
ii	Purchased	07 (100)	05 (42.10)	03 (6.97)	-	-	18 (09.00)
iii	Both	-	05 (26.31)	06 (13.95)	11 (09.32)	01 (07.69)	23 (11.50)
6	Provision of concentrate feed						
i	Regularly	02 (28.57)	06 (31.57)	16 (37.20)	41 (34.74)	07 (53.84)	72 (36.00)
ii	Occasionally	04 (57.14)	09 (47.36)	21 (48.83)	68 (57.62)	05 (38.46)	107 (53.50)
iii	Not used	01 (14.28)	04 (21.05)	06 (13.95)	09 (07.62)	01 (07.69)	21 (10.50)
7	Source of drinking water for cattle						
i	Well (Boar well)	-	05 (26.31)	21 (48.83)	89 (75.42)	09 (69.23)	124 (62.00)
ii	River	-	-	-	-	0	-
iii	Lake	-	-	-	06 (05.08)	04 (30.76)	10 (05.00)
8	Urea treatment	-	-	-	03 (02.54)	-	03 (01.50)
9	Hay and silage preparation	-	02 (10.52)	09 (20.93)	17 (14.40)	05 (38.46)	33 (16.50)

(Figures in parenthesis shows percentage of respective farmers)

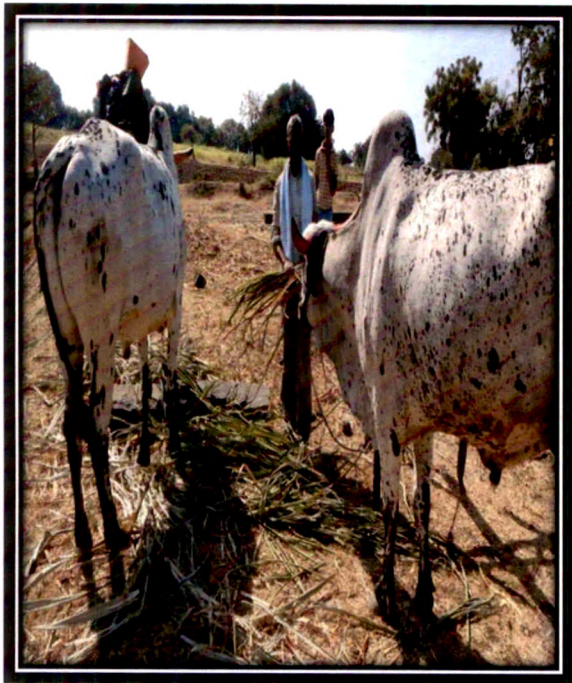


Plate 4.2: Feeding of sugarcane tops to animals



Plate 4.3: Sugarcane tops for feeding to animals

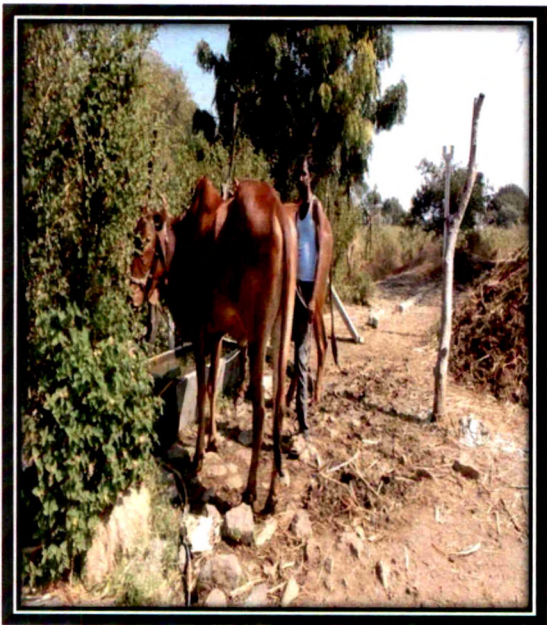


Plate 4.4: Watering of cattle



Plate 4.5: Chaffing of fodder by electric chaff cutter

It was observed the maximum number of large farmers used regularly concentrate feed 53.84 per cent and remaining categories of respondents 37.20, 34.74, 31.57 and 28.57 per cent of small, medium marginal and landless owner respectively.

The source of water for cattle used in sugarcane pockets was 62.00 per cent by well followed by lake. The awareness regarding fodder treatment was found negligible in surveyed area for urea treatment 1.50 per cent and silage/hay making 16.50 per cent only.

The feeding practices followed in surveyed area of sugarcane pockets of Latur districts are similar with the feeding practices observed by Patnage *et al*, (2002) and Rathore *et al*. (2010) stated in their study that fodder was produced from cereal crops grown in *kharif* and *rabi* season on rainwater, perennial fodder was grown where ample quantity or quality of water was available.

4.3.2. Housing pattern

The data on housing pattern used by the farmers is presented in table 4.8, it was observed from table 4.8 that the ordinary housing pattern were adopted by landless, small, medium, marginal and large farmers i.e. 100, 72.09, 59.32, 52.63 and 23.07 per cent, respectively whereas, constructed housing were used by large, medium, small and marginal farmers as 76.92, 40.46, 27.90 and 26.31 per cent respectively. The status of cattle shed observed in studied area as majority of farmers 65.00 per cent having separate cattle shed and 35.00 per cent converted the part of their residence as cattle shed, 63.00 per cent respondents having kaccha house floor for their cattle, 59.50 per cent well ventilated and 40.50 per cent farmers cattle shed have drainage system. Majority of farmers 91.50 per cent having galvanized iron roof used in cattle shed and 8.50 per cent local material. Kumar *et al*. (2005) reported the somewhat similar findings for feeding and housing management practices of Niliravi buffalo under field condition.

Table 4.8. Status of cattle shed in sugarcane pockets of Latur district (N = 200)

Sr. No	Component	Landless owners	Marginal Farmers	Small farmers	Medium farmer	Large farmers	Total
1	Cattle shed						
i)	Ordinary	07 (100)	14 (52.63)	31 (72.09)	70 (59.32)	03 (23.07)	125 (62.50)
ii)	Constructed	-	05 (26.31)	12 (27.90)	48 (40.46)	10 (76.92)	75 (37.50)
2	Housing pattern						
i)	Separate housing	04 (57.14)	12 (63.15)	28 (65.11)	74 (62.71)	12 (92.30)	130 (65.00)
ii)	Part of residence	03 (42.85)	07 (36.84)	15 (34.89)	44 (37.28)	01 (7.69)	70 (35.00)
3	Flooring						
i)	Kaccha	07 (100)	11 (57.90)	25 (58.13)	80 (67.79)	03 (23.07)	126 (63.00)
ii)	Pucca	-	08 (42.10)	18 (41.86)	38 (32.00)	10 (76.92)	74 (37.00)
4	Ventilation						
i)	Well ventilated	07 (100)	11 (57.89)	20 (46.51)	78 (66.10)	03 (23.07)	119 (59.50)
ii)	Not ventilated	-	08 (42.10)	23 (53.48)	40 (33.89)	10 (76.92)	81 (40.50)
5	Drainage out						
i)	Available	-	09 (47.36)	21 (48.83)	40 (33.89)	10 (76.92)	80 (40.00)
ii)	Not available	07 (100)	10 (52.63)	22 (51.16)	78 (66.10)	03 (23.07)	120 (60.00)
6	Type of roof						
i)	Galvanized iron	05 (71.42)	14 (73.68)	39 (90.69)	112 (94.91)	13 (100)	183 (91.50)
ii)	Local material	02 (28.57)	05 (26.31)	04 (09.30)	06 (05.06)	-	17 (08.50)

(Figures in parenthesis shows percentage of respective farmers)

4.3.3. Health care management practices

Proper health care practices should be followed for maintenance of animals health, prevention of various diseases and clean milk production. Considering these points, animal owners were asked about the various health care practices followed by them and results emerged from the study are presented in table 4.9.

It was observed from table 4.9 that nominally cleaning (daily collection of dung and manure) of cattle shed was done by 88.00 per cent and complete cleaning (In addition to normal cleaning regular washing of cattle shed) of cattle shed only followed by 12.00 per cent in all categories of respondents.



Plate 4.6: Constructed tail to tail system of cattle shed



Plate 4.7: kachha cattle shed



Plate 4.8: Part of residence as cattle shed

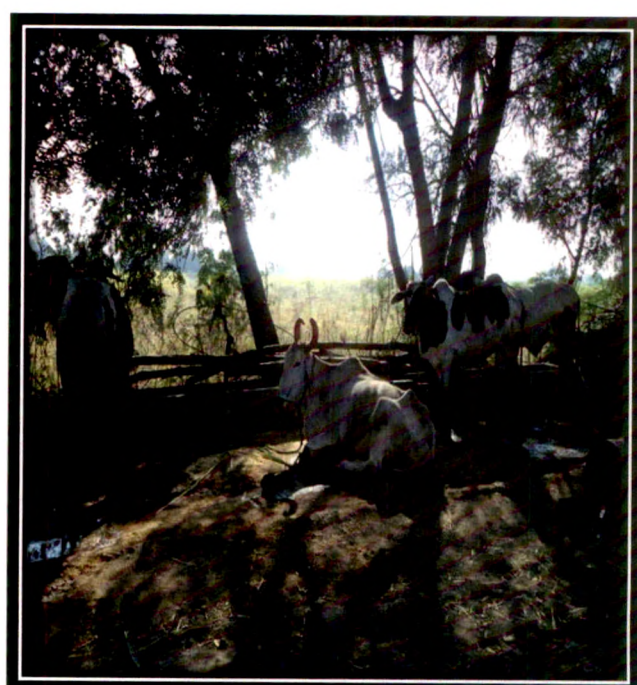


Plate 4.9: Housing of cattle in open space

Table 4.9. Status of animal health care in sugarcane pockets of Latur district
(N= 200)

Sr. No	Component	Landless owners	Marginal Farmers	Small farmers	Medium farmer	Large farmers	Total
1	Cleaning of shed						
i)	Nominal cleaning	07 (100)	17 (89.47)	39 (90.69)	102 (86.44)	11 (84.61)	176 (88.00)
ii)	Complete cleaning	-	02 (10.52)	04 (09.31)	16 (13.55)	02 (15.38)	24 (12.00)
2	Vaccination followed						
i)	Followed	05 (71.42)	16 (84.21)	39 (90.69)	105 (88.98)	13 (100)	178 (89.00)
ii)	Not followed	02 (28.57)	03 (15.78)	04 (09.30)	13 (11.01)	-	22 (11.00)
3	Sanitation of cattle byre						
i)	Hygienic	07 (100)	17 (89.47)	31 (72.09)	97 (82.20)	07 (53.84)	159 (79.50)
ii)	Unhygienic	-	02 (10.52)	12 (27.90)	21 (17.79)	06 (46.15)	41 (20.50)
4	Testing for mastitis						
i)	Yes	03 (42.85)	02 (10.52)	05 (11.62)	11 (09.32)	02 (15.38)	23 (11.50)
ii)	No	04 (57.14)	17 (89.47)	38 (88.37)	107 (90.67)	11 (84.61)	177 (88.50)
5	Care taken to keep floor dry						
i)	Yes	07 (100)	15 (78.94)	29 (67.44)	94 (79.66)	11 (84.61)	156 (75.00)
ii)	No	-	04 (21.05)	14 (32.55)	24 (20.33)	02 (15.38)	44 (22.00)
6	Periodically spraying insecticide in shed						
i)	Yes	03 (42.85)	12 (63.15)	07 (16.27)	15 (12.71)	06 (46.15)	33 (16.50)
ii)	No	04 (57.14)	17 (89.47)	36 (83.72)	103 (87.28)	07 (53.84)	167 (83.50)
7	Insurance of livestock						
i)	Yes	-	-	03 (06.97)	05 (04.23)	01 (07.69)	09 (04.50)
ii)	No	07 (100)	19 (100)	40 (93.02)	113 (95.76)	12 (92.30)	191 (95.50)

(Figures in parenthesis shows percentage of respective farmers)

The vaccination programme was followed by 100, 90.69, 88.98, 84.21 and 71.42 per cent of large, small, medium, marginal and landless owners, respectively and 79.50 per cent respondents maintained the hygienic condition of cattle byre and 20.50 per cent unhygienic cattle byre. Present findings are in accordance with the results of Varaprasad *et al.* (2013), Patel *et al.* (2014) and Sabapara (2015). Testing for mastitis was followed by 42.85, 15.38, 11.62, 10.52, and 09.32 per cent of landless, large, small, marginal and medium farmers, respectively and periodically spraying of insecticide in shed was followed by 63.15, 16.27, 12.71, 46.15 and 42.85 per cent of marginal, small, medium, large farmers and landless

owners, respectively. Total of 75.00 per cent of respondents kept floor dry. It was observed that 4.50 per cent of respondents possessed insurance of livestock, whereas 95.50 per cent respondent not secured their livestock.

4.3.4. Washing of cattle

Regular washing cum grooming of cattle is important management practice to obtain clean milk production and maintain the health of animal.

Table 4.10. Washing of cattle status followed in sugarcane pockets of Latur district (N =200)

Sr. No.	Component	Landless owners	Marginal farmers	Small farmers	Medium farmer	Large farmers	Per cent
1	Weekly	03 (42.85)	04 (21.05)	09 (20.93)	26 (22.03)	02 (15.38)	22.00
2	Fortnightly	03 (42.82)	08 (42.10)	13 (30.23)	28 (23.72)	06 (46.15)	29.00
3	Monthly	-	05 (26.31)	17 (39.53)	53 (44.91)	05 (38.46)	40.00
4	Not followed	01 (14.28)	02 (10.52)	04 (9.30)	11 (9.32)	-	09.00
	Total	100	100	100	100	100	100

(Figures in parenthesis shows percentage of respective farmers)

It is observed from the table 4.10 that washing of cattle were practiced in all categories of respondents. Majority of respondents wash their cattle monthly as 40 per cent followed by 29 per cent fortnightly, 22 per cent weekly and only 09 per cent cattle owners not washed the cattle regularly.

4.3.5. Milking practices

Considering the importance of clean milk production, the animal owners were interviewed for the various aspects of milking practices particularly milking method, cleaning of utensil, washing of hand and udder before milking, tying of legs at the time of milking and calf rearing method followed by them and information obtained are presented in table 4.11. It is clearly noticed from table no. 4.11 that the only two milking methods i.e. knuckling and full hand method. Majority of the animal owners (75.00%) followed and full hand milking 23.00 per cent animal owner practiced and very few farmers 01.50 per cent followed the machine milking method. Similar findings were reported by Rathore *et al.* (2010a) and Sarap *et al.* (2012), Kumar *et al.* (2014), Patel *et al.* (2014) and Sabapara (2015).

Table 4.11. Milking and calf rearing status in sugarcane pockets of Latur district
(N = 200)

Sr. No	Component	Landless owners	Marginal Farmers	Small farmers	Medium farmer	Large farmers	Total
1	Milking method						
i)	Full hand milking	05 (71.42)	04 (21.05)	09 (20.96)	26 (22.03)	02 (15.38)	46 (23.00)
ii)	Knuckling milking	02 (28.57)	16 (84.21)	34 (79.06)	89 (76.27)	10 (76.92)	151 (75.50)
iii)	Machine Milking	-	-	-	02 (1.69)	01 (07.69)	03 (01.50)
2	Cleaning of milk can and milk pail						
i)	Yes	07 (100)	19 (100)	43 (100)	118 (100)	13 (100)	200 (100)
ii)	No	-	-	-	-	-	-
3	Wash the hand, udder and teat before milking						
i)	Yes	07 (100)	19 (100)	43 (100)	118 (100)	13 (100)	200 (100)
ii)	No	-	-	-	-	-	-
4	Tie the legs of animal while milking						
i)	Yes	-	02 (10.52)	-	04 (03.38)	01 (07.69)	07 (03.50)
ii)	No	07 (100)	17 (89.47)	43 (100)	114 (69.61)	12 (92.30)	193 (96.50)
5	Methods followed for rearing of calf						
i)	Suckling	07 (100)	17 (89.47)	30 (69.76)	97 (82.20)	13 (100)	164 (82.00)
ii)	Weaning	-	02 (10.52)	13 (30.23)	21 (17.79)	-	36 (18.00)

(Figures in parenthesis shows percentage of respective farmers)

It was observed from table no. 4.11 that the care for clean milk production was mostly taken by all respondents (100 %) by providing their attention towards cleaning of milk can and milk pail, washing of hand, udder and teat before milking. It was observed that the tie the legs of animal while milking were followed by less number of farmers i.e. 03.38, 07.69 and 10.52 per cent by, medium, large and marginal farmers respectively, might be due to their domicile behavior and close contact with their animals. Majority of the animal owner followed suckling method (82.00%) for rearing of calf and weaning only in 18.00 per cent of cattle owners. The research findings of this study is partially agreed with the findings of Rathore *et al.* (2010a) and Sarap *et al.* (2012), Kumar *et al.* (2014), Patel *et al.* (2014) and Sabapara (2015). The variation may be due to the different breed, region, climate and local management tradition followed by cattle owners in respective area of studies conducted by these different workers.

4.3.6. Breeding management practices

Breeding of cattle is the key factor of animal improvement, which was also tried to study in the present investigation. Data obtained in this respect are presented in table 4.12. It is revealed from survey that majority of the cattle owners (87.00%) used natural service from local breeding bull available near to them, whereas only 13.00 per cent owners used A. I. techniques which should be inverse of the present situation. The similar finding were reported by Rathor *et al.* (2010a), Kumar *et al.* (2014) and Patel *et al.* (2014).

Table 4.12. Breeding status of cattle in sugarcane pockets of Latur district
(N = 200)

Sr. No	Component	Landless owners	Marginal Farmers	Small farmers	Medium farmer	Large farmers	Total
1	Method of breeding						
i)	Artificial insemination	02 (28.57)	03 (15.78)	04 (09.30)	13 (11.01)	04 (30.76)	26 (13.00)
ii)	Natural service	05 (71.42)	16 (84.21)	39 (90.69)	105 (88.98)	09 (69.23)	174 (87.00)
2	Heat detection of animals						
i)	Identify properly	07 (100)	16 (84.21)	38 (88.37)	112 (56.00)	11 (84.61)	184 (92.00)
ii)	Identify not properly	-	03 (15.78)	05 (11.62)	06 (05.08)	02 (15.38)	16 (08.00)

(Figures in parenthesis shows percentage of respective farmers)

It indicates that there may be lack of AI facility or awareness about AI. When considered according to farmer type, the small farmers 90.69 per cent of the animal owners used natural method of breeding was followed by 88.98, 84.21, 71.42 and 69.23 per cent of medium, marginal, landless and large farmers, respectively. Majority of the animal owners (92.00%) could identify their animal's heat properly and remaining 8.00 per cent found difficulty to identify heat of animals. Near about same condition for breeding practices was observed by Rathore *et al.* (2010a) and Kumar *et al.* (2014) in their study.

4.4. Constrains faced by cattle owners

The constraints faced by cattle owners were studied in two parts i.e. constraints for feeding and facilities constraints in sugarcane pocket area of Latur districts and presented in table no. 4.13.

Table 4.13 indicates that the major constraints faced by cattle owners were availability of grazing land (95.00%) followed by use of silage and urea treatment to dry fodder (82.00%), availability of ample quantity of fodder

(78.50%), effect of high prices of fodder on its supply (77.00%) and problem of concentrate feed of the animals (10.50%).

Table 4.13. Constraints in feeding and management practices in sugarcane pockets of Latur district (N = 200)

Sr. No	Component	Landless owners	Marginal Farmers	Small farmers	Medium farmer	Large farmers	Total
A	Feeding constraints						
1	Availability of ample quantity of fodder	07 (100)	15 (78.94)	38 (88.37)	88 (74.57)	09 (69.23)	157 (78.50)
2	Effect of high cost on fodder supply	07 (100)	14 (73.68)	34 (79.06)	99 (83.89)	-	154 (77.00)
3	Use of silage and urea treatment to dry fodder	07 (100)	17 (89.47)	34 (79.06)	98 (83.05)	08 (61.53)	164 (82.00)
4	Availability of farmers own grazing land	07 (100)	19 (100)	42 (97.67)	113 (95.76)	09 (69.23)	190 (95.00)
5	Use concentrate feed	01 (14.28)	04 (21.05)	06 (13.95)	09 (07.62)	01 (07.69)	21 (10.50)
B	Facilities constraints						
1	Availability of credit for purchasing animals	07 (100)	17 (89.00)	36 (83.72)	97 (82.20)	04 (30.76)	161 (80.50)
2	Availability of veterinary care hospital	05 (71.42)	14 (73.68)	34 (79.06)	92 (77.96)	10 (76.92)	155 (77.50)
3	Artificial insemination	05 (71.42)	16 (84.21)	39 (90.69)	105 (88.98)	13 (100)	178 (89.00)
4	Problem to identify the heat of animal	-	03 (15.78)	05 (11.62)	06 (05.08)	02 (15.38)	16 (08.00)
5	Non-availability of labour	07 (100)	16 (84.21)	32 (74.41)	75 (63.55)	04 (30.76)	134 (67.00)

(Figures in parenthesis shows percentage of respective farmers)

In case of facilities constraints it was observed that the major constraints faced by cattle owners were problems of artificial insemination recorded by 89.00 per cent cattle owners, followed by lack of credit facilities for purchasing good quality cattle (80.50%), availability of veterinary care hospital (77.50), the problem of non-availability of labour (67.00%) and problem of identify the heat of animal (08.00%).

4.5. Gap between existing practices over recommended practices

In addition to evaluate the management practices in surveyed area of sugar cane pockets of Latur it was essential to find out the gap between the recommended feeding practices for maintenance and production of cattle on a dairy farm with existing one. Keeping this view in mind, an attempt was made to study the existing feeding practices at the farmer's level for maintenance and production of cattle and compared with recommended practices suggested by animal husbandry scientists.

Table 4.14. Gap in feeding practices over recommended practices of cattle in surveyed area

Sr. No.	Categories of farmers	Feed items	Recommended Practices	Existing practices at dairy farmers level	Feed management gap
			Quantity/ animal /day(kg)	Quantity/ animal / day(kg)	Quantity/ animal / day(kg)
1	Marginal	Dry fodder	7.00 (100.00)	7.43 (106.14)	+0.43 (6.14)
		Green fodder	15.00 (100.00)	7.9 (52.66)	-7.1 (47.33)
		Conc. as per P and M	3.50 (100.00)	1.26 (36)	-2.24 (64)
2	Small	Dry fodder	7.00 (100.00)	7.85 (108.71)	+0.85 (12.14)
		Green fodder	15.00 (100.00)	7.61 (50.73)	-7.39 (49.26)
		Conc. as per P and M	3.50 (100.00)	1.40 (40)	-2.1 (60)
3	Medium	Dry fodder	7.00 (100.00)	9.74 (139.14)	+2.74 (39.74)
		Green fodder	15.00 (100.00)	9.26 (61.73)	-5.74 (38.26)
		Conc. as per P and M	3.50 (100.00)	1.60 (45.71)	-1.9 (54.28)
4	Large	Dry fodder	7.00 (100.00)	9.25 (132.14)	+2.25 (32.14)
		Green fodder	15.00 (100.00)	10.5 (70)	-4.5 (30)
		Conc. as per P and M	3.50 (100.00)	1.66 (47.42)	-1.84 (52.57)
5	Landless	Dry fodder	7.00 (100.00)	7.1 (101.42)	+0.1 (14.38)
		Green fodder	15.00 (100.00)	7.3 (48.66)	-7.7 (51.33)
		Conc. as per P and M	3.50 (100.00)	1.2 (34.28)	-2.3 (65.71)
6	Overall	Dry fodder	7.00 (100.00)	8.27 (118.14)	+1.27 (18.14)
		Green fodder	15.00 (100.00)	8.51 (56.73)	-6.48 (43.24)
		Conc. as per P and M	3.50 (100.00)	1.42 (40.57)	-2.07 (59.14)

Figures in parentheses indicate percentage to the recommended practices
(P=Production) (M=Maintenance)

For comparison the recommended management practices suggested by Sarap (2012) was considered. They suggested requirement for cattle's 7 kg dry fodder and 15 kg green fodder per day per cattle weighing on an average body weight of 300 kg., requirement of the concentrates @ 50.00 per cent of the milk production in addition to 3.50 kg concentrates for maintenance purpose. The overall gap of feeding practices of three categories over recommended practices has been worked out and

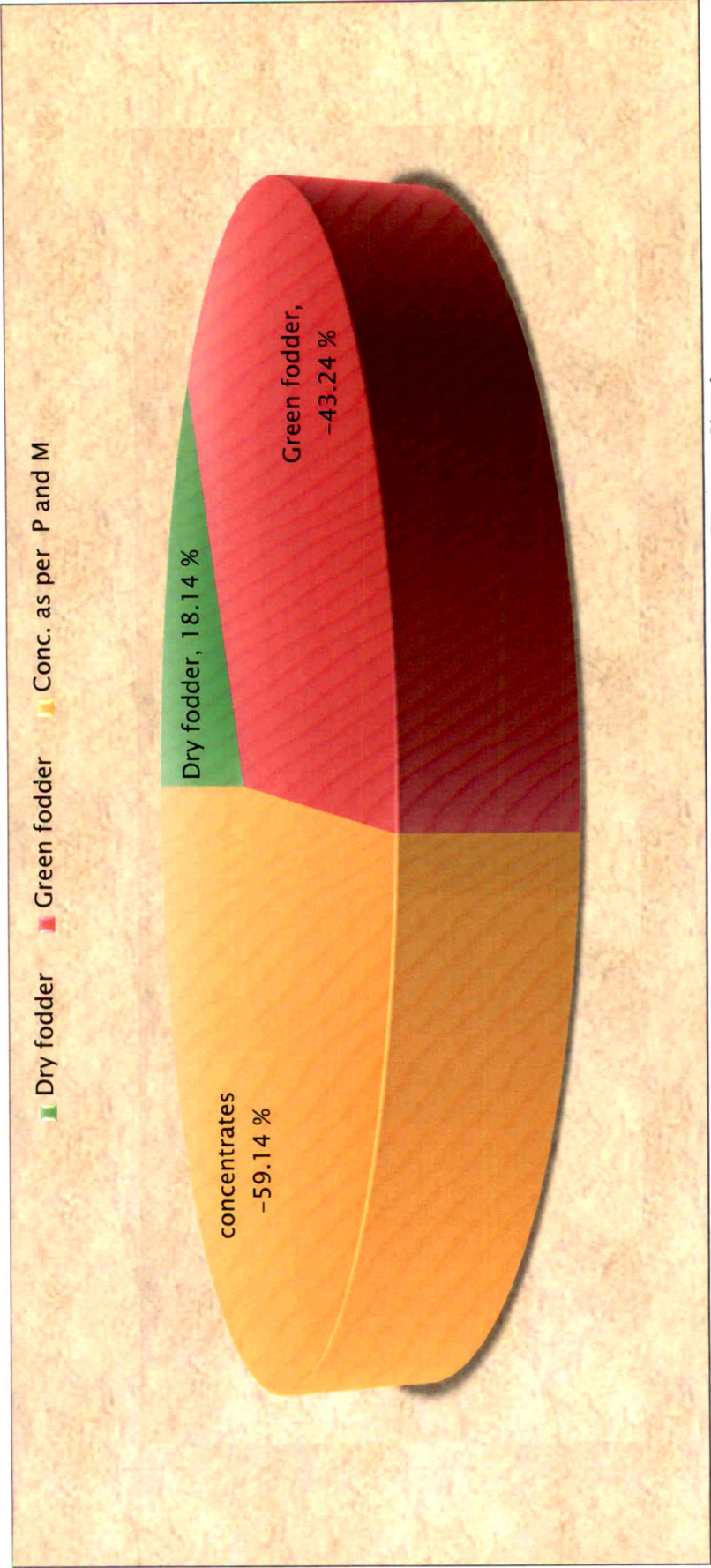


Fig.4.5. Overall gap of feed in sugarcane pockets area of Latur district

presented in table 4.14 and the trend of the gap has been depicted in fig.4.6. The dry fodder, green fodder and concentrates were fed to the extent of 8.27, 8.51 and 1.42 kg per day, respectively. The dry fodder was fed more to the extent of 18.14 per cent over recommended practices. A wide gap was also noticed in feeding of green fodder 43.24 per cent and concentrates 59.14 per cent at the farmer's level at an overall level. Same trend was also observed by Gujar *et al.* (2004) and Balakrishnan (1997). When the category wise observations is considered the same trend that is excess dry fodder and deficient green and concentrate feeding were observed in all category. It indicates that in surveyed area the availability of green fodder is less; therefore they used dry fodder adequately which was produce as byproducts of their regular/main agriculture produce on their own farm. Secondly, the gap was observed in concentrate feeding indicate and help to conclude that they are maintaining their livestock as a tradition or uneconomically, if they maintain the cattle for productive purpose they were provide concentrate sufficiently. These gaps found in surveyed area can correlate and agreed with their constraints recorded by them during survey study presented here in table no. 4.14.

4.6. Adoption of various management practices by cattle owners

The management practices play an important role in improving the production performances of animals and the upliftment of socioeconomic status of animal owners. Keeping this fact in mind, the adoption of major management practices were measured in terms of feeding, health care and milking. The data with respect to extent of adoption of all the practices are tabulated in forgoing tables and used to determine the adoption of various management practices, adoption indices and practice wise adoption.

Data in table 4.15 indicated that majority (64.50%) of animal owners had medium level of adoption followed by high (23.50%) and low level (12.00%) of adoption in overall feeding management practices. The adoption of overall health care practices revealed that majority of the animal owners had medium level of adoption (62.50%) followed by low (20.50%) and high (17.00%) level of adoption. These findings indicated that large percentage of animal owners level of adoption were in medium to low category, whereas only 13.33 per cent were found in high category. The medium to low adoption level of health care practices can be attributed to farmers' casual approach to dairying, their inability to isolate sick animals from healthy ones and lack of knowledge regarding regular health care of animals. The

present findings are in accordance with the results reported by Veeranna and Singh (2004). Majority of the animal owners had medium level of adoption (82.00%) followed by high (9.50%) and low (8.50%) level of adoption in overall milking practices. The findings regarding adoption level indicates that the farmers in surveyed area are not maintaining their animal on commercial basis which is a need of today and their self to improve their livelihood; this is more clear from figure no. 4.6 that medium level adoption was more in all management practices. It also gives indication to researchers and extension workers to focus their work at ground level in rural area.

Table 4.15. Adoption of various management practices by cattle owners in surveyed area in sugarcane pockets of Latur district.

Sr. No.	Management Practices	Category	Dairy Farmers Category											
			Marginal (19)		Small (43)		Medium (118)		Large (13)		Landless (7)		Overall (200)	
			No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	Feeding	Low	01	05.26	07	16.27	14	11.86	01	15.38	01	14.28	24	12.00
		Medium	14	73.68	25	58.13	78	66.10	07	76.92	05	71.42	129	64.50
		High	04	21.05	11	25.58	26	22.03	05	07.69	01	14.28	47	23.50
2	Health care	Low	01	05.26	08	18.60	29	24.57	02	15.38	01	14.28	41	20.50
		Medium	17	89.47	29	67.44	66	55.93	08	61.53	05	71.42	125	62.50
		High	01	05.26	06	13.95	23	19.49	03	23.07	01	14.28	34	17.00
3	Milking	Low	01	05.26	09	20.93	02	01.69	03	23.17	02	28.57	17	08.50
		Medium	15	78.94	28	65.11	109	92.67	08	61.53	04	57.14	164	82.00
		High	03	15.78	06	13.95	07	05.93	02	15.38	01	14.28	19	09.50

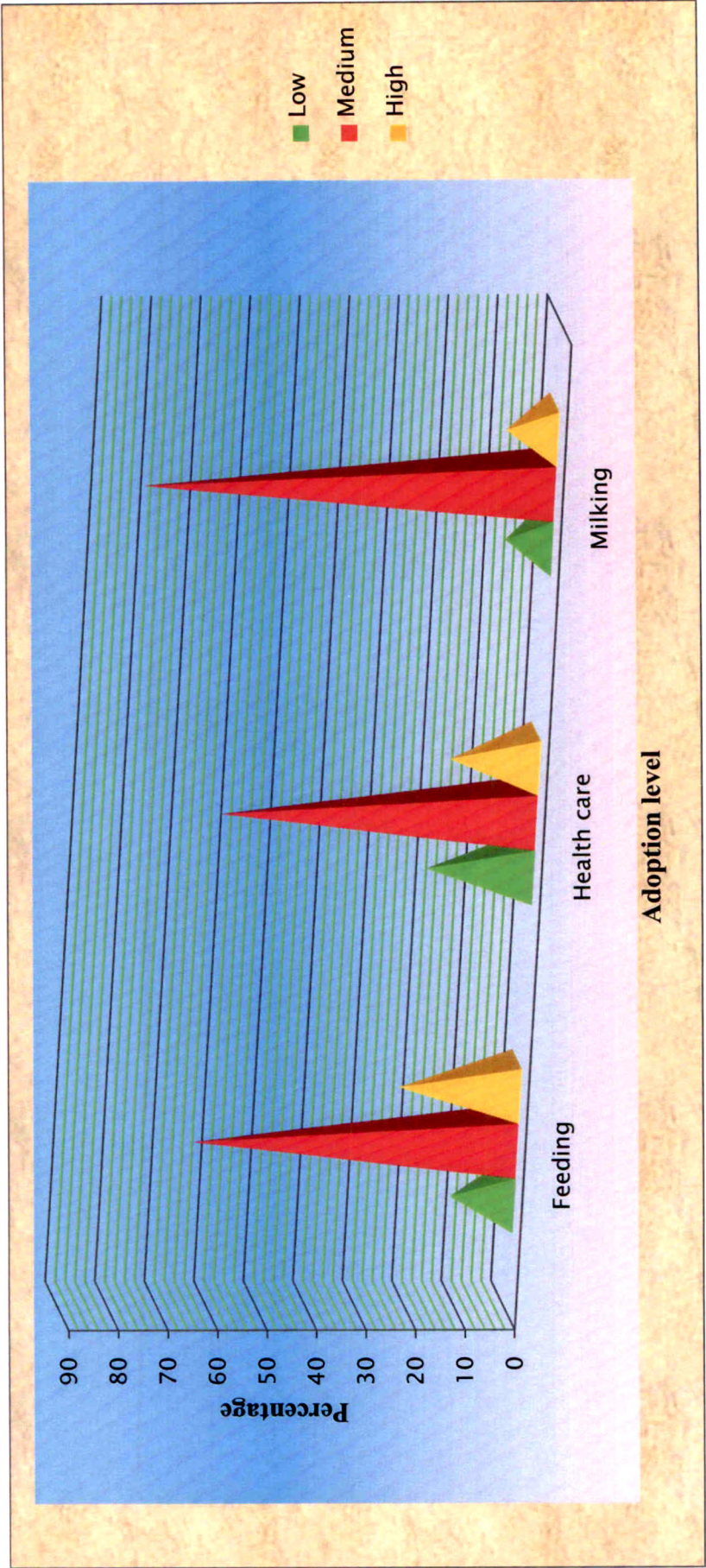


Fig. 4.6. Overall adoption level of various management practices followed by cattle owners in sugarcane area

Table 4.16. Adoption indices of various management practices

Sr. No.	Management Practices	Farmers Category	Adoption score	Adoption index (%)	Overall Adoption Score	Overall Adoption Index (%)	Rank
1	Feeding	Marginal	156	58.64	1645	58.75	II
		Small	358	59.46			
		Medium	971	58.77			
		Large	96	52.74			
		Landless	64	65.30			
2	Health care	Marginal	155	58.27	1416	50.57	III
		Small	295	49.00			
		Medium	824	49.87			
		Large	89	48.90			
		Landless	53	54.08			
3	Milking	Marginal	164	61.65	1690	60.35	I
		Small	372	61.79			
		Medium	993	60.10			
		Large	105	57.69			
		Landless	56	57.14			

Adoption index is the overall attitude of the user in respect to any work or practice to their extent of adoption level. The results presented in table 4.16 indicated the adoption index of different management practices. It was found that maximum adoption in the area of milking (60.35%) occupied first rank. The second and third position was occupied by feeding (58.75%) and health care (50.57%), respectively.

4.6.1. Practice-wise adoption of management techniques by cattle owners

Practice-wise adoption of improved dairy husbandry techniques like feeding, health care and milking practices were determined and total adoption score of each practice and mean adoption score was worked out. The ranks were also assigned to each practice in all the three mentioned practices. The results are presented as under.

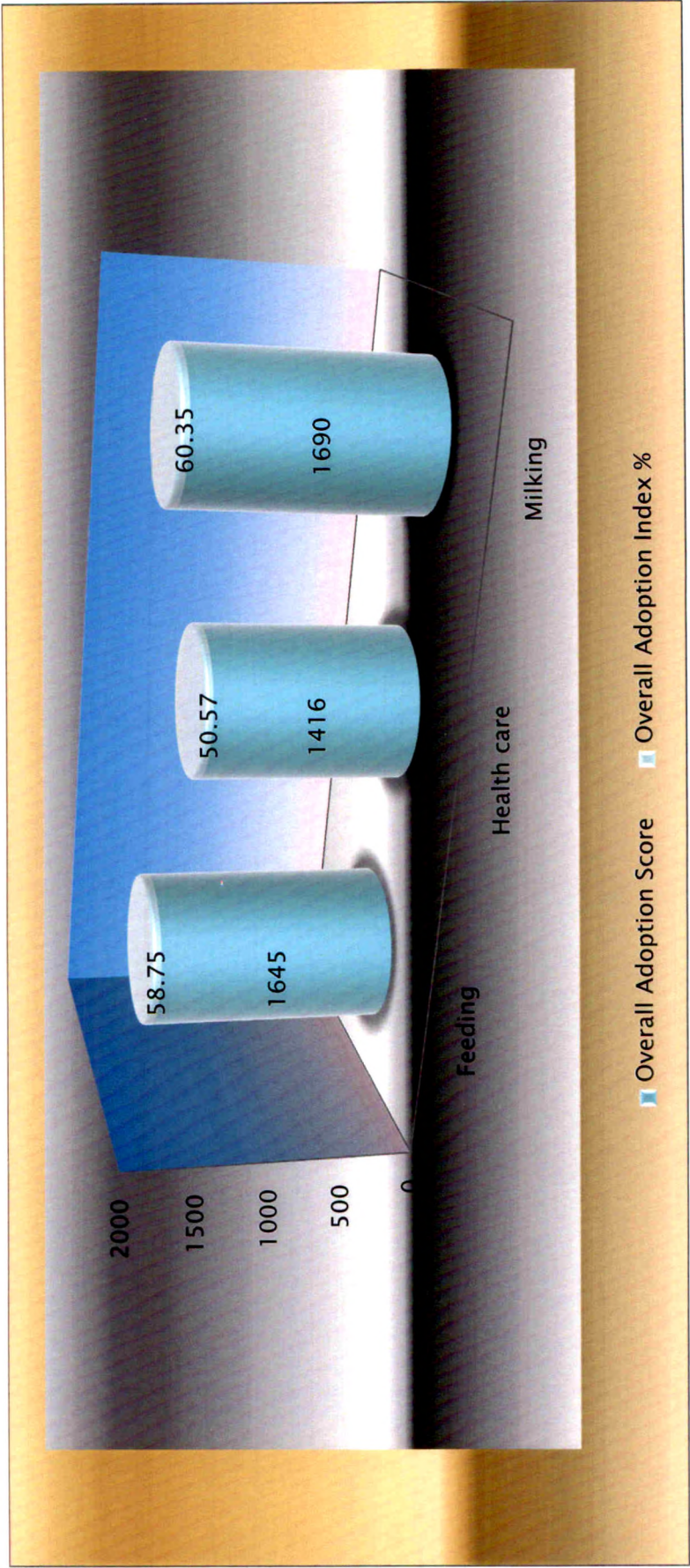


Fig. 4.7. Overall adoption indices of various management practices.

4.6.2 Overall adoption of feeding management practices by cattle owners

Adoption of overall feeding management practices presented in table 4.17 revealed that providing clean and fresh drinking water got the highest mean score (2.00) and occupied first rank. The second and third position was occupied by cutting of dry fodders before feeding (1.91) and sugarcane tops as fodder provides separately (1.56). Storage of fodder (1.07), grazing + stall feeding (0.99), hay and silage preparation (0.37) provision of concentrate feed (0.18) occupied the rank of 4th, 5th, 6th and 7th, respectively.

4.6.3. Overall adoption of health care practices by cattle owners

Adoptions of overall health care practices are presented in table 4.18 revealed that out of seven practices, cleaning of shed got the highest mean score (1.68) and awarded first rank. The second and third positions were occupied by timely and regularly vaccination (1.39) and sanitation of cattle byre (1.26), respectively. Care taken to keep floor dry (0.99), washing of cattle (0.94), periodically spraying insecticide in shed (0.26) and testing for mastitis (0.12) occupied the rank 4th, 5th, 6th and 7th, respectively.

Table 4.18. Practice -wise adoption level by cattle owners about health care practices.

Sr. No.	Items	Dairy Farmers Category																																	
		Marginal (19)						Small (43)						Medium (118)						Large (13)						Landless (07)						Overall (200)			
		TS	MS	MPS	RO	TS	MS	MPS	RO	TS	MS	MPS	RO	TS	MS	MPS	RO	TS	MS	MPS	RO	TS	MS	MPS	RO	TS	MS	MPS	RO						
1	Cleaning of shed	04	0.21	10.50	VI	86	2.00	100	I	236	2.00	100	I	4	0.30	15.38	VI	07	1.00	50.00	IV	337	1.68	84.25	I										
2	Timely and regularly vaccination	09	0.47	23.68	V	67	1.55	77.90	II	176	1.49	74.57	II	21	1.61	80.76	I	06	0.85	57.14	V	279	1.39	69.75	II										
3	Sanitation of cattle byre	32	1.68	84.21	I	53	1.23	61.62	III	150	1.27	63.55	III	07	0.53	26.92	V	11	1.57	78.50	I	253	1.26	63.25	III										
4	Washing of cattle	22	1.15	57.89	II	39	0.90	45.34	V	109	0.92	46.18	V	10	0.76	38.46	III	09	1.28	64.28	II	189	0.94	47.25	V										
5	Periodically spraying insecticide in shed	15	0.78	39.47	IV	07	0.16	08.13	VI	18	0.15	07.62	VI	8	0.61	30.76	IV	05	0.71	35.71	VI	53	0.26	13.25	VI										
6	Care taken to keep floor dry	19	1.00	50.00	III	38	0.88	44.18	IV	120	1.01	50.84	IV	13	1.00	50.00	II	08	1.14	57.14	III	198	0.99	49.50	IV										
7	Testing for mastitis	02	0.10	5.26	VII	05	0.11	05.80	VII	15	0.12	06.35	VII	00	0.00	00.00	VII	03	0.42	21.42	VII	25	0.12	06.25	VII										

TS: Total Score, MS:Mean Score, MPS: Mean Percent Score, RO: Rank Order

4.6.4. Overall adoption of milking practices by cattle owners.

Data presented in table 4.19 indicated that out of seven practices included in overall adoption of milking management practices, washing of hand before milking obtained the highest mean score (2.00) which revealed that the animal owners adopted these practices to the extent of 100 per cent, hence these were ranked first. Similarly, practices cleaning of udder before milking (1.84), cleaning of milk can and milk pail (1.72), regularity in milking time (1.36), methods followed for suckling of calf (0.36), full hand milking method (0.33) , machine milking method (0.24) occupied 2nd, 3rd,4th, 5th, 6th, and 7th, respectively.

Table 4.19. Practice -wise adoption level by cattle owners about milking practices.

Sr. No.	Items	Dairy Farmers Category																																			
		Marginal (19)						Small (43)						Medium (118)						Large (13)						Landless (07)						Overall (200)					
		TS	MS	MPS	RO	TS	MS	MPS	RO	TS	MS	MPS	RO	TS	MS	MPS	RO	TS	MS	MPS	RO	TS	MS	MPS	RO	TS	MS	MPS	RO								
1	Cleaning of udder before milking	33	1.73	86.84	III	81	1.88	94.18	III	221	1.87	93.64	I	23	1.76	88.46	III	11	1.57	78.57	II	369	1.84	92.25	II												
2	Regularity in milking time	34	1.78	89.47	II	83	1.93	96.51	II	120	1.01	50.84	III	24	1.84	92.30	II	12	1.71	85.71	I	273	1.36	68.25	IV												
3	Washing of hand before milking	38	2.00	100	I	86	2.00	100	I	236	2.00	100	IV	26	2.00	100	I	14	2.00	100	IV	400	2.00	100	I												
4	Machine Milking	00	0.00	00.00	VII	00	0.00	00.00	VII	27	0.22	11.44	VII	18	0.41	20.93	V	00	0.00	00.00	VII	48	0.24	12.00	VII												
5	Full hand milking method	08	0.42	21.05	VI	15	0.34	17.44	VI	36	0.30	15.25	V	02	0.15	07.69	VII	05	0.71	35.71	V	66	0.33	16.50	VI												
6	Methods followed for suckling of calf	11	0.57	28.94	V	17	0.39	19.76	V	34	0.28	14.40	VI	07	0.53	69.92	VI	04	0.50	25.57	VI	73	0.36	18.25	V												
7	Cleaning of milk can and milk pail	31	1.63	40.78	IV	72	1.67	83.72	IV	211	1.78	89.40	II	21	1.61	80.76	VI	10	1.42	71.42	III	345	1.72	86.25	III												

TS: Total Score, MS:Mean Score, MPS: Mean Percent Score, RO: Rank Order

4.6.5. Relationship between profile of the animal owners and adoption of management practices

Personal, social and economic characteristics of the animal owners play very important role in the process of adoption of dairy innovations with this hypothetication, it was thought appropriate to study their relationship with overall adoption. The efficiency of the animal owners to generate higher income from dairying depends on the effective adoption of improved dairy husbandry practices that lead to increase in productivity. The adoption of these practices by the farmers is further influenced by a set of factors related to socio-economic structure and information source utilization behavior of the dairy farmers. In this context, the correlation coefficient (r) values were computed to find out the relationship between selected socio-economic characteristics of animal owners and their adoption regarding management practices. The 'r' values of the considered characteristics are depicted in table 4.20.

Table 4.20. Relationship between personal, socioeconomic characteristic of cattle owners and their adoption regarding management practices

Sr. No.	Variables	Cattle owners Category				
		Marginal (n=19) 'r'	Small (n=43) 'r'	Medium (n=118) 'r'	Large (n=13) 'r'	Landless (n=07) 'r'
1	Age	-0.3254 ^{NS}	-0.1529 ^{NS}	-0.0508 ^{NS}	-0.2889 ^{NS}	-0.3371 ^{NS}
2	Education	0.2498 [*]	0.2022 [*]	0.1182 [*]	0.3857 ^{**}	0.2717 ^{**}
3	Family size	-0.1005 ^{NS}	-0.2112 ^{NS}	0.2062 [*]	-0.3508 ^{NS}	-0.3762 ^{NS}
4	Hard size	0.2497 [*]	0.1376 [*]	0.1155 [*]	0.4899 ^{**}	-0.6577 ^{NS}

NS=(Non-significant) *=(Significant) **=(Highly significant)

From table 4.20 it is revealed that age of all categories of farmers has negative but non significant relationship with adoption of feeding, milking and health care management practices.

Education of marginal, small and medium farmers had significant and positive correlation, with adoption of feeding, health care and milking management practices. While in case of large and landless owners it is positive had highly and highly significant with adoption of feeding, milking and health care management practices.

It indicates that education made the dairy animal owners progressive minded and made them to adopt newer technologies. Education also helps, in

development of understanding, awareness and strong belief on scientific practices which leads to adoption of dairy animal husbandry practices.

The family size had negative but non significant correlation between adoption of feeding, milking and health care management practices in marginal, small, large and landless cattle owners; large farmers was significantly positive correlation with adoption of these practices. The animal herd size in case of marginal, small and medium farmers had shown positive and significant correlation for adoption of feeding, health care and milking management practices, respectively. While large and landless owners was shown highly significant and positive correlation, with adoption of feeding, milking and health care management practices, respectively. Present results are similar to the results of Aulakh and Sharm (2010).

4.7. Ways and means to improve the feeding and management practices

Livestock play a vital role in the agricultural and rural economies of the developing world. Not only they produce food directly, they also provide key inputs to crop agriculture. Most farms in the developing world are too small to justify owning or using mechanization in farming, and the alternatives are animal power. To sustain the farmers or livestock owners and ultimately agriculture for future it is essential to suggest some ways and means to out come through the situation preset study, “Feeding and Management Practices Adopted by Cattle Owners in Sugarcane Pockets of Latur District” is as follows...

1. Ways and means for socio-economic status

In this respect the important point to improve in farmers are education and their financial ability, which will help and encourage them to adopt the new technology.

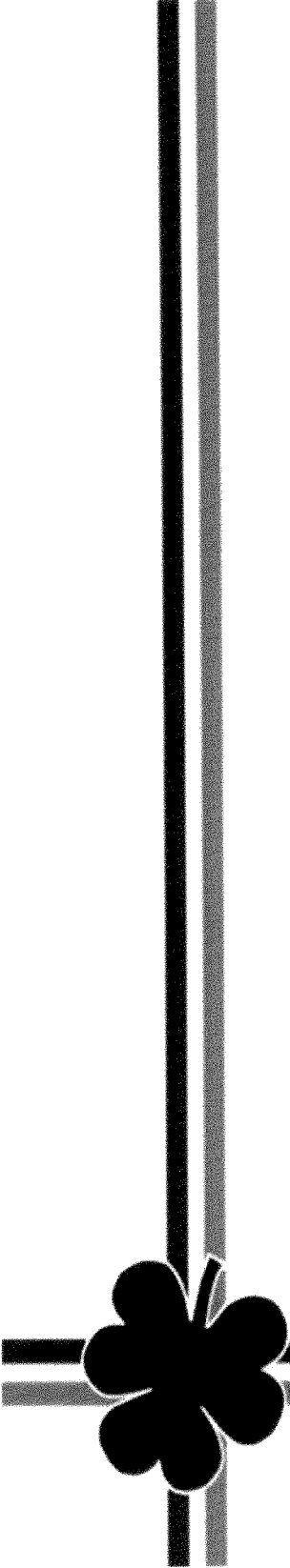
2. Ways and means for feeding and management

Feeding a balanced diet, avoiding overfeeding, and providing abundant supplies of cool and clean water will help to optimize feed and nutrient use on an animal farm. For this, processing of feed is helpful particularly in surveyed area of sugarcane pockets the use of sugarcane tops as green fodder and silage of sugar cane tops with other silage crops is needed. Next, use of by-product feeds are often used in feeding animals. These by-products are obtained from major grains and pulses and molasses might be useful as concentrate.

3. Ways and means for breeding and health

The training regarding the awareness for AI service to improve the local un-described breed, health camp, vaccination is needed in rural area along with its facility.

It was observed that it is essential to guide the farmers through agricultural extension workers regarding above ways to improve the status of farmer in respect to financial, social and technical through his livestock entrepreneurship.



Summary and Conclusion

CHAPTER - V

SUMMARY AND CONCLUSION

The present investigation was carried out to study the “Feeding and Management Practices Adopted by Cattle Owners in Sugarcane Pockets of Latur District” of Maharashtra. The sample consists of 200 farmers from randomly twenty villages were selected for collecting the data and ten cattle owners from each village were contacted for collecting the information through questionnaires and this information were utilized for further findings. The objectives of study were as follows.

5.1 Socio-economic status and available resources of farmers

5.2 Enumeration of cattle population in terms of age and sex

5.3 Feeding and management practices

5.4 Constraints faced by cattle owners

5.5 Gap between existing practices over recommended practices

5.6 Adoption of various management practices by cattle owners

5.1 Socio-economic status and available resources of farmers

The maximum number of respondents (56.00 per cent) were from middle age group followed by 25.00 and 19.00 per cent of the respondents were from old age and young age group, respectively. As regards with education the maximum respondents were found illiterate (28.00%), minimum under college level (19.50%) and primary and secondary education in 30.50 and 22.00 per cent, respectively.

Majority of the farmers belongs to small family 48.50 per cent having (1-5 members) followed by 40.00 per cent belongs to medium size family (5-8 members) and 11.50 per cent of large family size (more than 8). The sugarcane growers were 38.34 per cent only and other crop grown by 61.65 per cent farmer in surveyed area.

The maximum cattle owners (59.00 per cent) having land holding 2-5 ha. followed by small farmers (21.50%), marginal farmers (09.50%), large farmers (6.50%) and minimum was landless owners (3.50%) 55.50 per cent of the farmers having small herd size (1 to 5 animals), 36.50 per cent respondents were having medium herd size (6 to 10 animals) and 08.00 per cent of the respondents were possessing large herd size (more than 10 animals).

5.2 Enumeration of cattle population in terms of age and sex

The populations of indigenous male up to 1 year, 1-3 year and above 3 years were 23.41, 23.62 and 52.95 per cent as against the female 21.79, 13.73 and 64.47 per cent (48.50% for milking and 15.97% for dry). And the corresponding figures of crossbred cattles were 43.58, 35.89 and 20.51 per cent as against the female 21.37, 9.16 and 69.46 per cent (52.67% for milking and 16.79% for dry). The total percentage of indigenous and crossbred male in the population was 41.43 and 22.94 per cent. While, that the female was 58.56 and 77.05 per cent.

5.3 Feeding and management practices

The maximum number of farmers used grazing + stalls feeding 73.00 per cent and remaining used stall feeding 27.00 per cent. Supply of fodder in surveyed area was found 69.23 per cent inadequate and only 24.00 per cent farmers had adequate fodder supply. The 100 per cent supply of sugarcane tops as fodder was observed separately in all categories of respondents. Majority of respondents used sugarcane tops as fodder for all type of animal 63.00 per cent. The maximum number of large farmers used regularly concentrates feed 53.84 per cent and remaining categories of respondents 37.20, 34.74, 31.57 and 28.57 per cent of small, medium marginal and landless owner respectively.

The ordinary housing patterns were adopted by landless, small, medium, marginal and large farmers i.e. 100, 72.09, 59.32, 52.63 and 23.07 per cent, respectively. Majority of farmers 65.00 per cent having separate cattle shed and 35.00 per cent converted the part of their residence as cattle shed, 63.00 per cent respondents having kaccha house floor for their cattle, 60.00 per cent well ventilated and 40.00 per cent farmers cattle shed have drainage system.

Nominally cleaning (daily collection of dung and manure) of cattle shed was done by 88.00 per cent and complete cleaning (In addition to normal cleaning regular washing of cattle shed) of cattle shed only followed by 12.00 per cent in all categories of respondents and 4.50 per cent of respondents posses insurance of livestock, whereas 95.50 per cent respondent not secured their livestock.

Two milking methods namely knuckling method majority of the animal owners (75.00%) followed and full hand milking 23.00 per cent animal owner practiced. Majority of the animal owner followed suckling method (82.00%) for rearing of calf and weaning only in 18.00 per cent of cattle owners.

Majority of the cattle owners (87.00%) used natural service from local breeding bull available near to them, whereas only 13.00 per cent owners used A. I. techniques which should be inverse of the present situation. Majority of the animal owners (92.00%) could identify their animal's heat properly and remaining 8.00 per cent found difficulty to identify heat of animals.

5.4 Constraints faced by cattle owners

The major constraints faced by cattle owners were availability of grazing land (95.00%) followed by use of silage and urea treatment to dry fodder (82.00%), availability of ample quantity of fodder (78.50%), effect of high prices of fodder on its supply (77.00%) and problem of concentrate feed of the animals (10.50%).

The major constraints faced by cattle owners were problems of artificial insemination recorded by 89.00 per cent cattle owners, followed by lack of credit facilities for purchasing good quality cattle (80.50%), availability of veterinary care hospital (77.50), the problem of non-availability of labour (67.00%) and problem of identify the heat of animal (08.00%).

5.5 Gap between existing practices over recommended practices

The overall gap of feeding practices of three categories over recommended practices has been worked out; the dry fodder was fed more to the extent of 18.14 per cent over recommended practices. A wide gap was also noticed in feeding of green fodder 43.24 per cent and concentrates 59.14 per cent at the farmer's level at an overall level.

5.6 Adoption of various management practices by cattle owners

Majority of the animal owners had medium level of adoption (82.00%) followed by high (9.50%) and low (8.50%) level of adoption in overall milking practices.

The adoption index of different management practices, maximum adoption in the area of milking (60.35%) occupied first rank. The second and third position was occupied by feeding (58.75%) and health care (50.57%), respectively.

Conclusions

The present investigation was carried out to focus on “Feeding and Management Practices Adopted by Cattle Owners in Sugarcane Pockets of Latur District” It was reventet that in the surveyed area majority of cattle owners are shifting their livestock rearing aim from drought purpose to milch purpose might be the various reasons particularly decreasing land holding, increasing mechanization in agriculture protenious operation, less return from animal business and changed life style.

In this surveyed areas the feeding and management practices were found traditional instead of improved practices and facing the problem of scarcity of feed, breeding technology and lack of awareness for technology adoption. There is a need to guide farmers through agriculture extension regarding importance recommended management practices, prevision of dairying facilities and financial support.

The sugarcane tops can be utilized more effective by mixing and chapping with other fodder.

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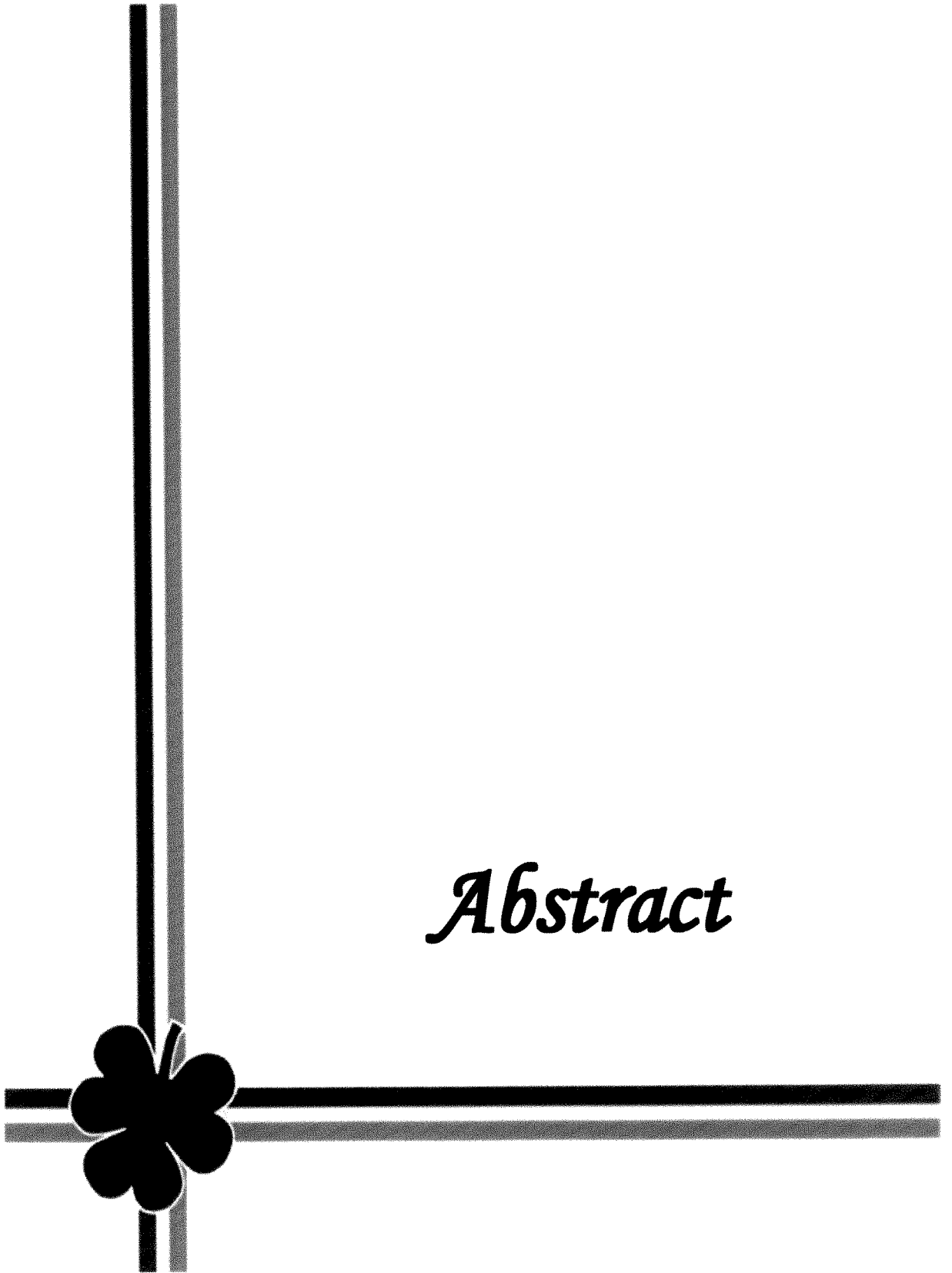
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Abstract



Department of Animal Husbandry and Dairy Science

College of Agriculture, Latur

**Research Title: “Feeding and Management Practices Adopted by Cattle
Owners in Sugarcane Pockets of Latur District”**

Name of Research Guide: Dr. P. V. Padghan	Name of Student: S. S. Tamboli
Asst. Professor	Reg. No: 2014A/18ML
Major discipline: Animal Husbandry	Minor discipline: Dairy Science

ABSTRACT

The present investigation entitled “Feeding and Management Practices Adopted by Cattle Owners in Sugarcane Pockets of Latur District” included sample size of 200 farmers from randomly twenty villages were selected for collecting the data and ten cattle owners from each village were contacted for collecting the information through questionnaires and this information were utilized for further findings.

The results obtained from this investigation found that in the study area on the total percentage of indigenous and crossbred male in the population was 41.43 and 22.94 per cent. While, that the female was 58.56 and 77.05 per cent. The maximum number of farmers used grazing + stalls feeding 73.00 per cent and remaining used stall feeding 27.00 per cent. Supply of fodder in surveyed area was found 69.23 per cent inadequate and only 24.00 per cent farmers had adequate fodder supply. The 100 per cent supply of sugarcane tops as fodder was observed separately in all categories of respondents. Majority of respondents used sugarcane tops as fodder for all type of animal 63.00 per cent.

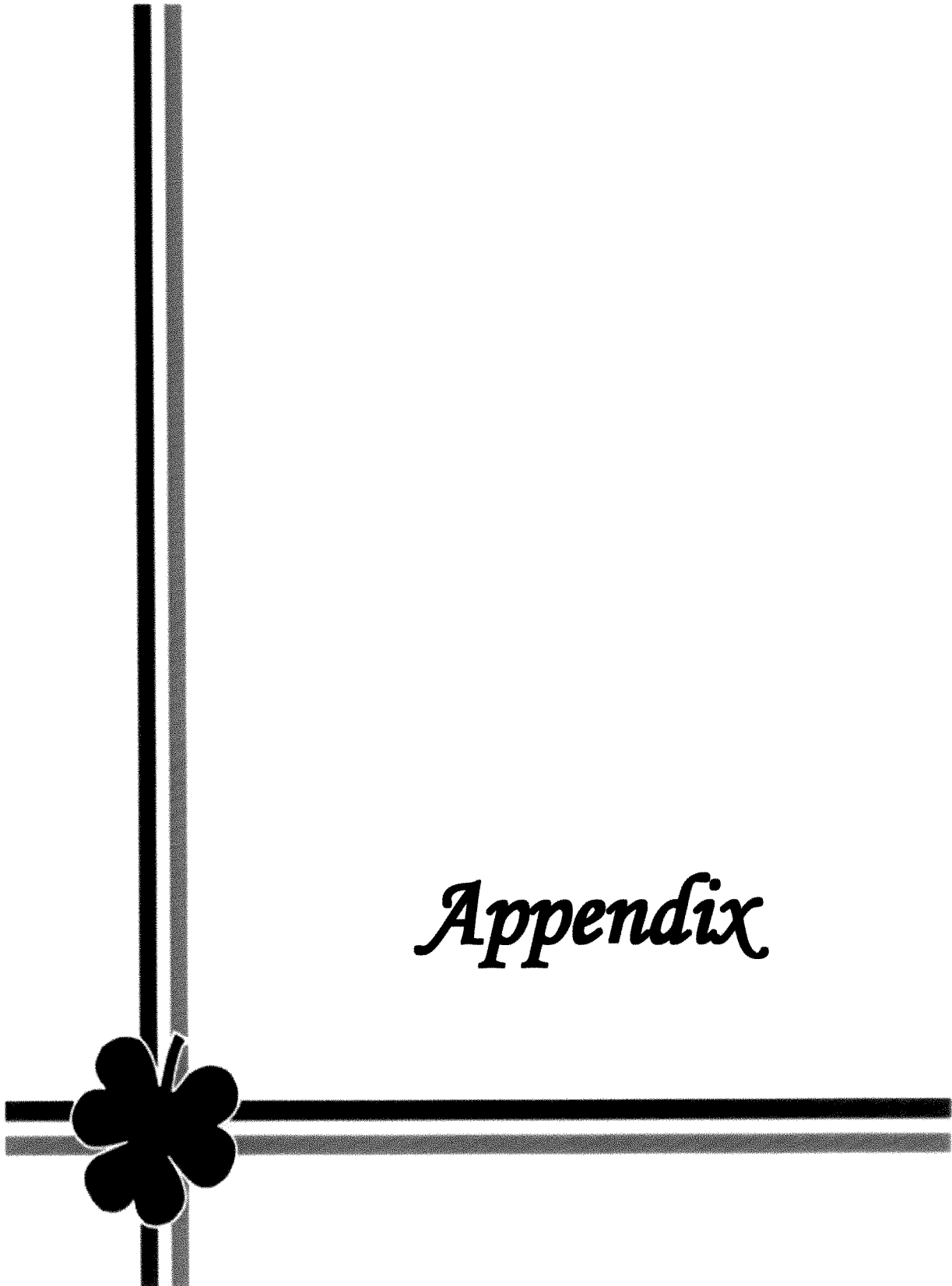
Majority of farmers (65.00 per cent) were having separate cattle shed and 35.00 per cent converted the part of their residence as cattle shed, 63.00 per cent respondents having kaccha house floor for their cattle, 60.00 per cent well ventilated and 40.00 per cent farmers cattle shed have drainage system.

Milking method was followed namely knuckling method majority of the animal owners (75.00%) followed and full hand milking 23.00 per cent animal owner practiced. Majority of the animal owner followed suckling method (82.00%) for rearing of calf and weaning only in 18.00 per cent of cattle owners. The major constraints faced by cattle owners were problems of artificial insemination recorded by 89.00 per cent cattle owners, followed by lack of credit facilities for purchasing good quality cattle (80.50%), availability of veterinary care hospital (77.50), the

problem of non-availability of labour (67.00%) and problem of identify the heat of animal (08.00%).

The overall gap of feeding practices of three categories over recommended practices has been worked out; the dry fodder was fed more to the extent of 18.14 per cent over recommended practices. A wide gap was also noticed in feeding of green fodder 43.24 per cent and concentrates 59.14 per cent at the farmer's level at an overall level. The adoption index of different management practices, maximum adoption in the area of milking (60.35%) occupied first rank. The second and third position was occupied by feeding (58.75%) and health care (50.57%), respectively.

Appendix



DEPARTMENT OF ANIMAL HUSBANDRY AND DAIRY SCIENCE
COLLEGE OF AGRICULTURE, LATUR,
VASANTRAO NAIK MARATHWADA KRISHI VIDYAPEETH PARBHANI
(M.S.)
Questionnaires

Area of research: District – Latur
Name of researcher: Tamboli Sainath Sambhaji
Research Guide: Dr. P. V. Padghan

A) General information about Farmer

2. Name of village:..... Contact No.:.....

3. Age:.....year.

4. Education:

a) Illiterate	b) Primary
c) Secondary	d) Above

5. Family member:

a) Small (1-5 members) b) Medium (5-8 members)

c) Large (More than 8 members)

6. Categories of farmer (Based on land holding)

a) Marginal (Less than 1 ha.) b) Small (1- 2 ha.)
c) Medium (2- 5 ha.) d) Large (More than 5 ha.)
e) Landless (Nil)

7. Herd size: a) Small (1-5) b) Medium (6-10) c) Large (>10)

8. Cropping pattern

a) Sugarcane + other crops

b) Other crops

B) Livestock status

1. Status of cattle

Species	Male calf	Female calf	Bull	Heifer	Bullock	Lactating	Dry	Total

2. Utility (yes1/no2)

Species	Milk production	Agril. operation	Breeding	Religious	Transport	Any other

C) Feeding and management practices

1) Feeding system

1. Grazing

2. Stall feeding

3. Grazing + stall feeding

TYPE OF FEED	MORNING		AFTERNOON		EVENING	
	Name	Qty.	Name	Qty.	Name	Qty.
Green fodder						
Dry fodder						
Concentrates						
Minerals						

2) Fodder requirement

Green Fodder	Kg./day	Dry fodder	Kg./day
Sugarcane tops		Kadabi	
Jowar/Nilwa		Soybean straw	
Green maize		Wheat straw	
Cultivated Grass		Others	
Others			
Total (kg)		Total (kg)	

i. Use of sugarcane tops as fodder:- Separately/Mixed with other feed.

ii. Type of animal feed sugarcane tops:- All type/Milch/Dry/Bullock.

iii. Source of water:- Well-1 (Boar well)/River-2/Canal-3:.....

iv. Supply of fodder:- Required quantity-1/Limited-2:.....

v. In which form feed is provided:- Wet-1/Dry-2:.....

3) Source of roughages:

i. Produced on own Farm-1/Purchased-2/Both-3:.....

ii. If fodder is grown on own farm, then which season fodder is grown
kharif-1/rabi-2/summer-3:.....

4) Provision of concentrate feed

a) Regularly

b) Occasionally

c) Not used

5) Hay and silage preparation

a) Yes

b) No

6) Urea treatment

a) Yes

b) No

7) Other dairy management practices followed in last five year

Sr. No.	MANAGEMENT PRACTICES	YES	NO
1	Sanitation of cattle shed		
2	Insurance of livestock's		
3	Vaccination followed		
4	Testing for mastitis		
5	Cleaning and sanitation of milk can and milk pail		
6	Mating at right time		
7	Cleaning of udder before & after milking		

D) Type of housing system adopted for dairy animal

i. Cattle shed: Ordinary / Constructed

ii. Housing pattern: Separate housing / Part of residence

iii. Level of floor: Sloppy / Leveled

iv. Type of roof: Galvanized iron / Local material / Other

v. Ventilation: Well ventilated / Not ventilated

vi. Drainage out: Available / Not available

vii. Cleaning of shed: Nominal cleaning / Complete cleaning

viii. Sanitation of cattle byre: Hygienic / Unhygienic

ix. Care taken to keep floor dry: Yes / No

x. Periodically spraying insecticide in shed: Yes / No

xi. If washed,when? Daily-1/Weekly-2/Forthnight-3/Monthly 4:.....

E) Method of milking and care taking before, during and after milking

i. Type of milking system adopted:

ii. Do you wash the udder and teat before milking: Yes / No

iii. Do you tie the legs of animal while milking: Yes / No

iv. Do you leave the calf for suckling after milking: Yes / No

v. Do you know about machine milking: Yes / No.

vi. Methods followed for rearing of calf: Weaning-1 / Suckling-2:.....

F) Breeding status of cattle

i) Method of breeding

a) Artificial insemination

b) Natural service

ii) Heat detection of animals

a) Identify properly

b) Not identify properly

G) Constraints in adoption of cattle management practices

A.	FEEDING CONSTRAINTS	YES	NO
1	Availability of ample quantity of fodder		
2	Effect of high cost on fodder supply		
3	Use of silage and urea treatment to dry fodder		
4	Availability of farmers own grazing land		
5	Use concentrate feed		
B	FACILITIES CONSTRAINTS		
1	Availability of credit for purchasing animals		
2	Availability of veterinary care hospital		
3	Artificial insemination		
4	Problem to identify the heat of animal		
5	Non-availability of labour		

Appendix II
Extent of adoption of improved dairy husbandry practices

Sr. No.	Feeding practices	RA	OA	NA
		Score		
		2	1	0
1	Grazing + stall feeding			
2	Use of sugarcane tops as separately			
3	Storage of fodder			
4	Provide clean and fresh drinking water			
5	Cutting of dry fodders before feeding			
6	Hay and silage preparation			
7	Provision of concentrate feed			
	Healthcare practices			
1	Cleaning of shed			
2	Timely and regularly vaccination			
3	Sanitation of cattle byre			
4	Washing of cattle			
5	Periodically spraying insecticide in shed			
6	Care taken to keep floor dry			
7	Testing for mastitis			
	Milking practices			
1	Cleaning of udder before milking			
2	Regularity in milking time			
3	Washing of hand before milking			
4	Machine Milking			
5	Full hand milking method			
6	Methods followed for suckling of calf			
7	Cleaning of milk can and milk pail			

RA= Regular Adopted OA= Occasionally Adopted, NA= Not Adopted

VITA

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EDUCATION QUALIFICATION

1. Bachelor of Science (B. Sc. Agri.) with second class (69.50%) in 2014.
College of Agriculture, Parbhani, Vasantrao Naik Marathwada Krishi
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2. Higher Secondary School Certificate Examination (H.S.C.) From
Bhimashankar Mahavidhyalaya Shiradhon Tal. Kandhar, Dist Nanded in
2009.
3. Secondary School Certificate Examination (S.S.C) From Samata Vidhyala
Osmana-nagar Tal. Kandhar, Dist Nanded in 2007

OTHER INFORMATION

1. Basic knowledge about internet networking.
2. Also having Experience of Groundnut seed Production under experiential
learning in 8th semester.
3. I have completed NCC "C" certificate examination with "B" grade